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

VOL. XX.

# THE HISTORY OF THE

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THE  
CYCLOPÆDIA;

OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY

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

WITH THE ASSISTANCE OF

EMINENT PROFESSIONAL GENTLEMEN.

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IN THIRTY-NINE VOLUMES.

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# CYCLOPÆDIA:

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ARTS and SCIENCES.

### K I L N.

**KILN**, in *Agriculture*, a kind of oven or stove for admitting heat, in order to dry substances of various kinds, as corn, malt, hops, &c. It also signifies a fabric or building constructed for the purpose of burning lime-stone, chalk, and other calcareous stones, into lime. Kilns are of different kinds, and formed in different ways, according to the purposes for which they are designed.

**KILN-Ashes**, the ashes made in kilns where wood, straw, furze, &c. are burnt. These ashes are useful as manure for almost any kind of soil, but especially such as possess much vegetable matter. In the western districts, the farmers sift them over their corn and grass; but this must not be done in windy weather, because they are so very light, that they would easily be blown away and lost. They are found to succeed best when laid on just before rain falls. See **ASHES**.

**KILN, Brick.** See **BRICK-Kiln** and **BRICK**.

**KILN, Hop**, a stove or kiln constructed for the purpose of drying or stoving hops. See **HOP** and **OAST**.

**KILN, Lime**, a sort of kiln constructed for the purpose of burning various kinds of calcareous substances, such as lime-stone, chalk, shells, &c. into lime. They are built of different forms or shapes, according to the manner in which they are to be wrought, and the kinds of fuel which are to be employed. It has been remarked, in a work on landed property, that, in places where materials are dear, from their being fetched from a distance, and where the fuel is coals, and also expensive, the form of a kiln is mostly that of an inverted cone, a form which has its inconveniences; but in districts where the art of burning lime is practised with superior attention and correctness, the form has of late years been gradually changing from conical to elliptical. But, in his opinion, "the best form of a lime furnace, in

the established practice of the present day, is that of the egg placed upon its narrower end, having part of its broader end struck off, and its sides somewhat compressed, especially towards the lower extremity; the ground plot or bottom of the kiln being nearly an oval, with an eye, or draft-hole, toward each end of it." It is supposed that "two advantages are gained, by this form, over that of the cone. By the upper part of the kiln being contracted, the heat does not fly off so freely as it does out of a spreading cone. On the contrary, it thereby receives a degree of reverberation, which adds to its intensity." But the other, and still more valuable effect is this: "when the cooled lime is drawn out at the bottom of the furnace, the ignited mass, in the upper parts of it, settles down, freely and evenly, into the central parts of the kiln; whereas, in a conical furnace, the regular contraction of its width, in the upper as well as the lower parts of it, prevents the burning materials from settling uniformly, and levelling downward. They "hang" upon the sides of the kiln, and either form a dome at the bottom of the burning mass, with a void space beneath it, thereby endangering the structure, if not the workmen employed; or, breaking down in the centre, form a funnel, down which the under-burnt stones find their way to the draft-holes." And "the contraction of the lower part of the kiln has not the same effect; for, after the fuel is exhausted, the adhesion ceases, the mass loosens, and, as the lime cools, the less room it requires: It therefore runs down freely to the draft-holes, notwithstanding the quick contraction of the bottom of the kiln or furnace."

And, lastly, that, "with respect to the lime-furnace (which is, he thinks, entitled to the most sedulous attention of agricultural chemistry), the fire requires to be furnished

with a regular supply of air. When a kiln is first lighted, the draft-holes afford the required supply. But after the fire becomes stationary, in the middle, or towards the upper part of the kiln (especially of a tall kiln), while the space below is occupied by burnt lime, the supply from ordinary draft-holes becomes insufficient. If the walls of the kiln have been carried up dry or without mortar, the air finds its way through them to the fire. In large deep kilns that are built with air-tight walls, it is common to form air-holes in their sides, especially in front, over the draft-holes. But these convey the air, in partial currents, to one side of the kiln only, whereas that which is admitted at the draft-holes passes regularly upward to the centre, as well as to every side of the burning mass; and, moreover, tends to cool the burnt lime in its passage downward, thereby contributing to the ease and health of the workmen. Hence he is of opinion, that the size of the draft-holes ought to be proportionate to that of the kiln, and the size of the stones taken jointly (air passing more freely among large than among small stones), and that the required supply of air should be wholly admitted at the draft-holes. By a sliding or a shifting valve, the supply might be regulated, and the degree of heat be encreased or diminished, at pleasure," according to circumstances.

The most ancient kind of lime-kiln is probably that which is made by excavating the earth in the form of a cone, of such a size as may be necessary; and afterwards building up the sides, or not, according to the circumstances of the case: the materials being then laid in, in alternate layers of fuel and stone, properly broken, until the whole is filled up. The top is then covered with sods, in order that the heat may be prevented from escaping; and the fire lighted at the bottom, and the whole of the contents burnt, in a greater or less space of time, in proportion to the nature of the stone, and the quantity that is contained in the kiln. From the circumstance of the top parts of these kilns, in some districts, being covered over, and the sides sometimes built up with sods, they are termed *sod-kilns*, in order to distinguish them from the other forts. When the whole of the contents of such kilns are grown cold, they are drawn or taken out from the bottom; and the kiln again filled, if necessary. These kilns are obviously intended for burning only one kiln-full at a time. But as the burning of lime in this way is tedious and uneconomical, other methods and forms of kilns have been had recourse to. Where lime is much wanted, either for agriculture or other purposes, they therefore use perpetual kilns, or what are more generally known by the name of *draw-kilns*. These, as all lime-kilns ought to be, are, the author of Modern Agriculture says, situated by the side of a rising bank, or sheltered by an artificial mound of earth. They are generally built either of stone or brick; but the latter, as being better adapted to stand excessive degrees of heat, is considered as preferable. The outside form of such kilns is sometimes cylindrical, but more generally square. The inside should be formed in the shape of a hoghead, or an egg, opened a little at both ends, and set on the smallest; being small in circumference at the bottom, gradually wider towards the middle, and then contracting again towards the top. In kilns constructed in this way, it is observed, fewer coals are necessary, in consequence of the great degree of reverberation which is created, above that which takes place in kilns formed in the shape of a sugar-loaf reversed. Near the bottom, in large kilns, two or more apertures are made: these are small at the inside of the kiln, but are sloped wider, both at the sides and the top, as they extend towards the outside of the building. The

uses of these apertures are for admitting the air necessary for supplying the fire, and also for permitting the labourers to approach with a drag and shovel, to draw out the calcined lime. From the bottom of the kiln within, in some cases, a small building, called a horse, is raised in the form of a wedge, and so constructed as to accelerate the operation of drawing out the burned lime-stone, by forcing it to fall into the apertures which have been mentioned above. In other kilns of this kind, in place of this building, there is an iron grate near the bottom, which comes close to the inside wall, except at the apertures where the lime is drawn out. When the kiln is to be filled, a parcel of furze or faggots is laid at the bottom; over this a layer of coals; then a layer of lime-stone, which is previously broken into pieces, about the size of a man's fist; and so on alternately, ending with a layer of coals, which is sometimes, though seldom, covered with sods or turf, in order to keep the heat as intense as possible. The fire is then lighted in the apertures; and when the lime-stone towards the bottom is completely calcined, the fuel being considerably exhausted, the lime-stone at the top subsides. The labourers then put in an addition of lime-stone and coal at top, and draw out at bottom as much as they find thoroughly burned; and thus go on, till any quantity required be calcined. When lime-stone is burned with coals from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  bushels, on a medium, 3 bushels of calcined lime-stone are produced for every bushel of coals used in the process.

A lime-kiln of this sort is described in count Rumford's Essays, which is in possession of the Dublin Society, as well as the principal objects that ought to be had in view in constructing of the kiln pointed out: the first of which is, "to cause the fuel to burn in such a manner as to consume the smoke, which has here been done by obliging the smoke to descend and pass through the fire, in order that as much heat as possible might be generated. Secondly, to cause the flame and hot vapour, which rise from the fire, to come in contact with the lime-stone by a very large surface, in order to economize the heat, and prevent its going off into the atmosphere; which was done by making the body of the kiln in the form of a hollow truncated cone, and very high in proportion to its diameter; and by filling it quite up to the top with lime-stone, the fire being made to enter near the bottom of the cone.

"Thirdly, to make the process of burning lime perpetual, in order to prevent the waste of heat which unavoidably attends the cooling of the kiln, in emptying and filling it, when, to perform that operation, it is necessary to put out the fire.

"And, fourthly, to contrive matters so, that the lime in which the process of burning is just finished, and which of course is still intensely hot, may, in cooling, be made to give off its heat in such a manner, as to assist in heating the fresh quantity of cold lime-stone with which the kiln is replenished, as often as a portion of lime is taken out of it.

"To effectuate these purposes, the fuel is not mixed with the lime-stone, but is burned in a close fire-place, which opens into one side of the kiln, some distance above the bottom of it. For large lime-kilns on these principles, there may be several fire-places all opening into the same cone, and situated on different sides of it; which fire-places may be constructed and regulated like the fire-places of the furnaces used for burning porcelain.

"At the bottom of the kiln there is a door, which is occasionally opened to take out the lime.

"When, in consequence of a portion of lime being drawn out of the kiln, its contents settle down or subside,  
the

the empty space in the upper part of the kiln, which is occasioned by this subtraction of the burned lime, is immediately filled up with fresh lime-stone.

“As soon as a portion of lime is taken away, the door by which it is removed must be immediately shut, and the joinings well closed with moist clay, to prevent a draft of cold air through the kiln. A small opening, however, must be left, for reasons which are explained below.

“As the fire enters the kiln at some distance from the bottom of it, and as the flame rises as soon as it comes into this cavity, the lower part of the kiln (that below the level of the bottom of the fire-place) is occupied by lime already burned; and as this lime is intensely hot, when, on a portion of lime from below being removed, it descends into this part of the kiln, and as the air in the kiln, to which it communicates its heat, must arise upwards in consequence of its being heated, and pass off through the top of the kiln, this lime, in cooling, is by this contrivance made to assist in heating the fresh portion of cold lime-stone, with which the kiln is charged. To facilitate this communication of heat from the red-hot lime just burned to the lime-stone above in the upper part of the kiln, a gentle draft of air through the kiln, from the bottom to the top of it, must be established, by leaving an opening in the door below, by which the cold air from without may be suffered to enter the kiln. This opening (which should be furnished with some kind of a register) must be very small, otherwise it will occasion too frequent a draft of cold air into the kiln, and do more harm than good; and it will probably be found best to close it entirely, after the lime in the lower part of the kiln has parted with a certain proportion of its heat.”

The height of the kiln, which is represented in *Plate (Kiln) Agriculture, fig. 1.* is on a scale of 15 feet: its internal diameter below, two feet; and above, nine inches. In order more effectually to confine the heat, its walls, which are of brick, and very thin, are double, and the cavity between them is filled with dry wood-ashes. To give greater strength to the fabric, these two walls are connected in different places by horizontal layers of brick, which unite them firmly: *a* is the opening by which the fuel is put into the fire-place: through this opening the air descends which feeds the fire. The fire-place is represented nearly full of coals, and the flame passing off laterally into the cavity of the kiln, by an opening made for that purpose at the bottom of the fire-place. The opening above, by which the fuel is introduced into the fire-place, is covered by a plate of iron, moveable on hinges; which plate, by being lifted up more or less by means of a chain, serves as a register for regulating the fire. A section of this plate, and of the chain by which it is supported, are shewn in the figure: *b* is an opening in the front wall of the fire-place, which serves occasionally for cleansing out the fire-place, and the opening by which the flame passes from the fire-place into the kiln. This opening, which must never be quite closed, serves likewise for admitting a small quantity of air to pass horizontally into the fire-place. A small proportion of air, admitted in this manner, has been found to be useful and even necessary in fire-places, in which, in order to consume the smoke, the flame is made to descend. Several small holes for this purpose, fitted with conical stoppers, may be made in different parts of the front wall of the fire-place.

The bottom of the fire-place is a grate constructed of bricks placed edgewise, and under this grate there is an asphalt; but as no air must be permitted to pass up through this grate into the fire-place, the ash-pit door, *c*, is kept constantly closed, being only opened occasionally to remove the ashes: *d* is the opening by which the lime is taken out

of the kiln; which opening must be kept well closed, in order to prevent a draught of cold air through the kiln. As only as much lime must be removed at once as is contained in that part of the kiln which lies below the level of the bottom of the fire-place, to be able to ascertain when the proper quantity is taken away, the lime, as it comes out of the kiln, may be directed into a pit sunk into the ground in front of the opening by which the lime is removed; this pit being made of a proper size to serve as a measure for it. And while the lime is removing from the bottom of the kiln, fresh lime-stone should be put into it above; and during this operation, the fire may be damped by closing the top of the fire-place with its iron-plate. Should it be found necessary, the fire, and the distribution of the heat may, in burning the lime, be further regulated by closing more or less the opening at the top of the lime-kiln with a flat piece of fire-stone, or a plate of cast-iron. The double walls of the kiln, and the void space between them, as also the horizontal layers of bricks by which they are united, are clearly and distinctly expressed in the figure in the plates.

This method of constructing lime-kilns, though ingenious and philosophical, is probably much too expensive for general use.

It is a common practice to burn lime-stone with furze in some places. The kilns which are made use of in these cases are commonly known by the denomination of *flame-kilns*, and are built of brick; the walls from four to five feet thick, when they are not supported by a bank or mound of earth. The inside is nearly square, being twelve feet by thirteen, and eleven or twelve feet high. In the front wall there are three arches, each about one foot ten inches wide, by three feet nine inches in height. When the kiln is to be filled, three arches are formed of the largest pieces of limestone, the whole breadth of the kiln, and opposite to the arches in the front wall. When these arches are formed, the lime-stone is thrown promiscuously into the kiln to the height of seven or eight feet, over which are frequently laid fifteen or twenty thousand bricks, which are burned at the same time with the lime-stone. When the filling of the kiln is completed, the three arches in the front wall are filled up with bricks almost to the top, room being left in each sufficient only for putting in the furze, which is done in small quantities, the object being to keep up a constant and regular flame. In the space of thirty-six or forty hours, the whole lime-stone, about one hundred and twenty, or one hundred and thirty quarters, together with the fifteen or twenty thousand bricks, are thoroughly calcined. Kilns constructed in this way may be seen near Wellingborough, in Northamptonshire, and other places in the northern parts of the kingdom. And in many of the northern counties of Scotland, which are situated at a great distance from coal, it is also a common practice to burn lime-stone with peat; and, considering the rude ill-constructed kilns which are used for the purpose, it is astonishing with what success the operations are performed. In some of these districts, it is stated that lime-stone is sufficiently calcined with peats, laid *stratum super stratum*, in kilns formed of turf; but, owing to the quantity of ashes which fall from the peat, the quality of the lime is considerably injured; and from the open and exposed situation of many of these kilns, the waste of fuel is immense. But the most common method of burning lime-stone with peat, is in kilns constructed somewhat similar to those in the districts where furze is used as the only fuel. There are in general only two arches, or fire-places, and the peats are thrown into the bottom of these arches, the fronts of which are seldom closed up, by which means the wind has

often great influence in retarding the operation, and frequently prevents the complete calcination of the lime-stone. An improvement might, it is supposed, be made on these kilns at a very trifling expence: if an iron grate were laid across the bottom of the arch, with a place below for the ashes to fall down, and the front of the arch closed up by a door made of cast-metal, one-third of the fuel might be saved, and the operation performed in a shorter time, and with a much greater certainty, than by the method now practised in such kilns.

In the Communications to the Board of Agriculture, Mr. Rawson asserts, that he has produced a considerable saving in the burning of lime, by constructing his kiln in the manner shewn at *fig. 2*. "It is made twenty feet in height; at the bottom a metal plate is placed one foot in height, intended to give air to the fire; over this plate the shovel that draws the lime runs. The sloped sides are six feet in height, the breadth at the top of the slope is eight feet, the sides are carried up perpendicular fourteen feet, so as that every part of the inside, for fourteen feet, to the mouth, is exactly of the same dimensions. On the mouth of the kiln a cap is placed, built of long stones, and expeditiously contracted, about seven or eight feet high. In the building of the cap, on one side of the slope, the mason is over the centre of the kiln, so that any thing dropping down will fall perpendicularly to the eye beneath. He is here to place an iron door of eighteen inches square, and the remainder of the building of the cap is to be carried up, until the hole at the top be contracted to fourteen inches. The kiln is to be fed through the iron door, and when filled, the door close shut. The outside wall must be three feet at the bottom to batter up to two feet at top, and made at such a distance from the inside wall of the kiln, that two feet of yellow clay may be well packed in between the walls, as every kiln built without this precaution will certainly split, and the strength of the fire be thereby exhausted. At eight feet high from the eye of the kiln, two flues should be carried through the front wall, through the packed clay, and to the opposite sides of the kiln, to give power to the fire." It is observed, that with this kiln, he has produced one-third more lime from a given quantity of fuel; and stones of bad quality will be here reduced into powder, and may be put into the kiln without the necessity of being broken so small as usual. As many situations will not admit of building a kiln twenty feet high, while other situations may allow of its being built thirty or even forty feet (for it cannot be made too high), the diameter of the kiln should be proportioned to the height to which it is carried up.

And it is further stated, as another application of this sort of contrivance, that "for several years he has made use of a small kiln in an outside kitchen, the height nine feet, the diameter three feet and a half. In the side of the kiln next the fire, he had three square boilers placed, one of them large, containing half a barrel, with a cock, which supplied the family with constant boiling water; for the two others, he had tin vessels made to fit the inside with close covers, in which meat and vegetables with water were placed and put into the two smaller boilers, which never had any water, but had close covers. The tin boilers were heated sooner than on the strongest fire, and when the meat, &c. were sufficiently dressed, the whole was taken out of the metal boilers. At one side he had an oven placed for roasting and boiling meat; the bottom was metal of twenty-six inches diameter, and one inch and a half thick, a flue from the fire went underneath. Even with the bottom of the oven, a grating nine inches square was placed, which opened a

communication between the oven and the hot fire of the kiln. The height of the oven was fourteen inches, shut close by a metal door of eighteen inches square, and the top, level with the mouth of the kiln, was covered by another metal plate of half an inch thick, on which was placed a second oven; the heat which escaped through the half-inch plate, though not near the fire, was sufficient to do all small puddings, pies, breakfast-cakes, &c. &c. The meat in the large oven was placed on an iron frame which turned on a pivot and stood on a dripping-pan, and was turned by the cook each half hour. And over the kiln he had a tiled stage for drying corn, and a chimney at one side, with a cawl on the top, which carried off all steam and sulphur: a large granary was attached to the building. It is added, that the lime, if sold, would more than pay for fuel and attendance; and he has frequently had dinner dressed for fifty men, without interfering with his family business in any great degree.

There is another form of lime-kiln, which answers extremely well for general use, represented at *fig. 3*, in the same plate. This is capable of being built without any very considerable expence.

It has been found, by experience, in some of the northern districts, that lime-kilns are rendered much less liable to crack and burst by having the outside walls carried up in a square manner, than on the usual circular plan.

**KILN, Malt,** a sort of kiln contrived for the purpose of drying malt or any kind of grain upon. In the construction of kilns of this sort many improvements have lately been made. A description of a kiln of this kind by Mr. Pepper, of Newcastle-under-Line, has been given, in which *fig. 4*, is the ground plan, supposed to be twenty feet square, but, if required larger or smaller, by following the same proportion, it may be made to any size or situation. The dark shaded walls rise four feet high, to put the reflector upon over the fire, and also what the side arches stand upon, the brick piers, that carry the spark-stone, and bearers that the tiles lie upon. Letter *a*, the fire-grate, which lies nine inches below the bottom edge of the reflector; *b*, bottom edge of the reflector; *c, c, c, c*, brick pillars nine inches square, that carry the spark-stone; *d, d, d, d, d, d*, brick pillars nine inches square, that carry the bearers for the floor tiles to lie upon; *e*, shews the bottom of the side arches on each side of the kiln; *f*, exhibits the space between the fire-place and the side arches, for the man to go round to clean the kiln; *g*, the wall on each side of the kiln, that the side arches stand upon. *Fig. 5*, is a section of it; *g*, shews the section of the wall which the side arches stand upon; *h*, the door to go to the fire-place; *i*, the reflector of cast iron that covers the fire; *k*, small door in the reflector to feed the fire; *l, l*, the ears of the reflector that the iron pipes are fitted upon, which convey the smoke, &c. from the reflector round the kiln, to the chimney; *m*, what is commonly called the spark-stone; it prevents the kiln from being too hot in the middle, and assists in spreading the heat to the outides; *n*, bearers of cast-iron or wood, that carry the kiln floor; *o, o*, shew the ends of the ribs that carry the tiles; *p*, the kiln tiles, that the malt lies upon; *q*, the steam-pipe that conveys the steam from the malt; *c, c*, brick pillars nine inches square, that carry the spark-stone; *d, d*, brick pillars nine inches square, that carry the bearers for the floor tiles to lie upon; *c, c*, shew the arches on each side the kiln; *u, u*, denotes the situation of the pipes under the floor. And *fig. 6*, is a plan of the kiln floor, and shews the ribs that the kiln-tiles lie upon; *o, o*, the cast iron or wood ribs that the tiles lie upon; *n, n*, the bearers that carry the ribs; *d, d*, the tops of the brick pillars

pillars that carry the bearers, &c.; *b*, the reflector that covers the fire, which is of cast iron, about an inch thick, hollow, and on a femicircular plan, as shewn in the figures; *r, r*, the iron pipes that convey the smoke and heat from the reflector, round the kiln, to the chimney, which lies about three feet under the kiln floor, and about the same distance from the side walls, which are supported by iron stays from the side arches; *f, f*, the ends of the iron pipes that go into the chimney; *t, t*, registers to regulate the draught and heat of the kiln; and *fig. 7.* is a section of the chimney.

It is noticed that in the plate the pillars, bearers, &c. that belong to the same thing, are marked with the same letters in all the different figures.

Another kiln of the same sort, invented by Mr. Joseph Coppinger, of Harbour View, near Cove, Ireland, is represented at *fig. 8.* This is stated to be particularly adapted to the use of farmers, who, in wet seasons, often lose quantities of grain for want of such convenience. The advantages it appears to possess above the kilns now in common use, are many; first, it may be erected for one-tenth of the expence, if the value of the separate buildings be taken in, which are now almost invariably allotted for this purpose; secondly, any kind of fuel may be used without prejudice to the malt or corn to be dried in it: thirdly, the heat (by the construction of the flues) will be more regularly and evenly distributed without any waste, as at present: fourthly, the health of the people attending, will not, as at present, be exposed to certain injury, by always breathing and sleeping in a heated and unwholesome atmosphere, as their beds will be placed in a shed on the outside of the building. This, in his mind, is the most important part of the plan, and highly worthy the attention of every humane and considerate employer in this way: fifthly, this construction of a kiln may be erected on a loft or ground floor. If in the latter situation, sufficient elevation should be given to the fire-place, so as not to impede the draught. These are the principal advantages that occur to the writer. If the experience of others confirm them, he will be highly gratified: *a*, the main walls; *b*, the flues; *c*, the chimnies; in each of which may be placed a metal damper to regulate the heat. It is recommended, in the case of a new building, to carry up the flues of the chimnies in the thickness of the walls. In a house already built, they may be carried up either inside or outside the building; *d*, the fire-place, which may be divided, or in one, just as desired, by which the half or the whole may be heated, as is most convenient.

It is stated that kiln tiles eighteen inches square, and two inches thick in the solid, with a lapping of half an inch broad and one inch deep round the edge of each tile, are proposed for covering the flues, which, if fairly cast, may be laid dry, without mortar. If it should be difficult, or too expensive, to procure tiles of eighteen inches, nine inches can be made to answer. The flues are proposed to be divided by a brick, on edge, so as that every eighteen-inch tile will cover two flues. The breadth of the flues may be six inches and a half, and ten inches high. This proportion, it is hoped, will be found to answer in most cases; but it may be varied according to the better judgment of the party erecting. The sides and bottoms of the flues should be plastered. The platform of this kiln should, in all cases, be well rammed with earth, and made perfectly level before laying out the flues. Iron grate-doors are intended to be hung on hinges, in a recess, at the mouth of each flue, to prevent them being choked with large pieces of cinder, or other substances. It is also intended that these doors should shut and open at pleasure, as may be found necessary in carrying on the business.

**KILN Tiles**, in *Rural Economy*, the name of that sort of tiles which are employed in malt and other similar sorts of kilns.

**KILNS for tin-ore.** The place where the tin-ore is roasted in order to burn away the mundic, and other sulphureous matters that are mixed with it, is called the *tin-kiln*. This is of a very plain structure; its hearth or floor is made of one large stone, and this is covered with another, supported at six inches height above it. The uppermost has a hole in the middle, through which the ore is poured on the under one; and when it is distributed over it in a bed of three or four inches thick, it is burnt by means of a fire of furze bushes kept underneath, and communicating with the space between the two stones by an aperture behind; the lower stone not reaching the wall by six inches.

When the sulphur is all burnt away by the fire, and the flame is no longer blue, the whole bed of roasted ore is thrust off the stone by the rake into the aperture behind, through which it falls into the open fire. The fire is kept up with new bushes, and there is a new bed of ore thrown in at the hole above. Thus the fire is kept up day and night, and supplies of fresh ore made through the hole by the black tin brought from the buddles of washing troughs. When the lower part of the furnace is filled up with the ore thrown into it, there is a hole behind the kiln, through which this ore, and the coals and ashes, are all raked out together, and left in the open air to cool; and the whole mass thus raked out, will sometimes be several days in cooling, the mixture of coals among it keeping it red-hot for a considerable time. When it is taken away from behind the furnace, it is washed again before it is put into the melting furnace. It is observed, that the different ores require for this last operation a different proportion, and different sort of fuel. The moor-tin, that is, such ore as is dug up in the moory countries, melts best with moor-charcoal charred; but that dug on the hills is found to run best with a mixture of charcoal and peat in equal quantities. The stones used for the kilns are always moor-stone. Phil. Trans. N<sup>o</sup> 60.

**KILN**, in *Ship Building*, a convenience for boiling or steaming planks to make them pliable. A boiler-kiln is either made of sheet-copper, bottom and sides rivetted together, or the bottom of sheet-copper and the sides of lead, rivetted and folded together. This is fixed in a body of brick-work, and under each end, or in the middle, are furnaces to cause the water to boil after the planks are in. The upper part, to preserve the steam and facilitate the boiling, is inclosed by shutters, opening by hinges and small tackles.

*Dimensions of a Copper Boiler.*

					feet.	in.
Long	-	-	-	-	40	0
Broad at the ends	-	-	-	-	4	3
	-	middle	-	-	6	0
Deep	-	-	-	-	2	10

And weighed 53cwt. 3lt. 14lb.

A steam-kiln is a trunk composed of deals grooved and tongued together edgeways, and is from three to four feet square, and from 40 to 60 feet long, and has a door at each end. It is confined together by bolts driven through the sides at certain distances, which answer the purpose of bearers, whereon the planks rest while steaming. It is supported, about four feet above the ground, upon a strong framing of wood. Underneath it, in the middle, is fixed, in brick-work, a large copper or iron boiler, or, which is better, one towards each end; the steam from the boilers, issuing into the trunk wherein it is confined, enters into the pores of the plank, and renders it very pliable.

**KILONDA**, in *Geography*, a town of Africa, in the kingdom of Benguela; 15 miles S. of Benguela.

**KILONGO**, a province of Loango, the foil of which is fertile. It was formerly an independent kingdom: the governor is absolute, and is elected by the people, without consulting the king of Loango. The chief article of trade is elephants' teeth. Kelingo, the capital, is situated on the coast; 30 miles N.W. of Loango. S. lat. 4° 25'.

**KILPATRICK**, *Old and New*, two parishes in the west of Scotland, and county of Dumbarton. Old Kilpatrick is situated on the banks of the river Clyde, about five miles east from Dumbarton, and within one mile of Bowling bay, where the great canal, or Forth and Clyde navigation, falls into the Clyde. It is one of the most pleasantly situated villages in Scotland, being directly opposite to the pleasure grounds of Erskine-house, the residence of lord Blantyre, the superior of the parish. The parochial stipend being paid in grain is considered to be one of the best in Scotland. The church is a very ancient building of the Gothic kind, and here are said to be deposited the remains of the tutelary saint of Ireland, from whence the village takes its name. There is an extensive manufactory of rolled and malleable iron conducted here, and there are two large cotton mills in the neighbourhood. The spinning of woollen by machinery was attempted, but did not succeed. Those engaged in the cotton manufacture are employed from Glasgow and Paisley. New Kilpatrick is about four miles distant from Old Kilpatrick. There is no manufacture of any importance about it, excepting some large flour mills upon the river Kelvin, which are the property of sir Ilay Campbell, of Garfeule, bart. lord president of the Court of Session.

**KILSYTH**, a town of Dumhartonshire, bordering on Stirlingshire, in Scotland, about thirteen miles north-east from Glasgow, upon the old or north road from Edinburgh to Glasgow, and near the banks of the great canal; or Forth and Clyde navigation. The country about Kilsyth is level to the south, east, and west, but very mountainous to the north. The valley is in general fine arable land, and the cultivation is now extremely good and most rapidly improving, for which there are the greatest facilities afforded by the inexhaustible supplies of coal and lime, which are found in every part of the neighbourhood. Kilsyth is of no importance as a commercial or manufacturing place, its chief manufacturing trade being confined to the labour of operative tradespeople in weaving, tambouring, and sewing muslins for the manufacturers of Glasgow. There are, however, some extensive printfields at no great distance. Kilsyth gave the title of an earl to an ancient and noble family of Scotland, but the title and estate were forfeited by the rebellion, in the year 1715. Cumbernauld-house, in the neighbourhood, is the residence of lord Elphinstone, the chief person of rank in this quarter, and lord lieutenant of the county. A very great proportion of the adjoining lands, formerly attached to the earldom, now belong to sir Charles Edmonstone, of Dunleath.

**KILTZESTI**, a town of Walachia, in the Tifmania; 12 miles S.S.W. of Tergofyl.

**KILWARA**, a town of Hindoostan, in the circar of Rantampour; 32 miles S. of Suifopour.

**KILWINNING**, a small town and parish in Ayrshire, upon the coast, about two or three miles from Irvine. It contains but little population, and is not remarkable for any particular art or manufacture. The lands around it are chiefly the property of the earl of Eglington, whose superb castle is in the immediate vicinity. Kilwinning is chiefly remarkable for the attention paid in it to the order of freemasonry, the lodge of Kilwinning claiming precedence, in point of

antiquity, to every other lodge in Scotland, which, in their turns, assert their antiquity to be greater than those of England; the Scottish mafons assuming the title of *ancient* as a mark of their priority, and refusing to acknowledge or receive those whom they denominate modern mafons until they have qualified themselves to be received, by undergoing certain ceremonies of initiation only known to the brethren. The claim of the Kilwinning mafons is so far admitted, that many of the lodges of Scotland receive charters of constitution from them in place of the grand lodge of Scotland. These lodges generally distinguish themselves by adding the word Kilwinning to the title which they have assumed. They are numerous through every part of the country, and the circumstance alluded to creates no kind of rivalry or dissention between them and those constituted by the authority of the grand lodge.

**KILY HARBOUR**, a bay on the W. coast of the island of Celeses. S. lat. 1° 33'. E. long. 119° 20'.

**KIMALISHA**, an island of Russian Lapland, lying between the mouths of the rivers Shuya and Soroka, off the coast of the White sea; where the granite veins of micaceous earth are richly mixed with a beautiful brown, frequently glandulous, with granites and green transparent shorl.

**KIMBOLTON**, a small market town in the hundred of Leightonstone and county of Huntingdon, England, is situated 10 miles from Huntingdon, and 63 from London. In the population return of 1800, the number of houses was stated to be 252; of inhabitants 1266. A weekly market is held on Fridays; and here are two annual fairs. The only object in the town of particular import is Kimbolton-castle, a feat of the duke of Manchester, which is of unknown, but very remote origin. Leland says, "the castle is double diked, and the building of it metely strong; it longed to the Mandevilles, erles of Essex. Sir Richard Wingfield built new, fair lodgyns and galleries upon the old foundation of the castle. There is a plotte now cleue desolated, not a mile by west from Kimbolton, called Castle-hill, where appear ditches and tokens of old buildings." This castle was the jointure, and became the retirement, of queen Catherine, after her divorce from Henry VIII. Henry, first earl of Manchester, expended large sums in making it a comfortable residence; and his grandson Robert, the third earl, made very considerable alterations and many additions. It is a quadrangular building; the inside is most superbly fitted up, and decorated with numerous paintings. Beauties of England, vol. viii.

**KIMBULA**, in *Zoology*, the name of a species of crocodile found in the island of Ceylon, and of a very beautiful variegation of colours, being mottled all over with extremely elegant black spots shining with the gloss of black velvet.

**KIMCHI**, **DAVID**, in *Biography*, a learned rabbi, who acquired high reputation as a scripture commentator, was a native of Spain, and flourished in the twelfth and thirteenth centuries. His father, Joseph, was a bitter enemy to Christians, and wrote some severe treatises against them, but the subject of the present article speaks of Christians with moderation, and he is highly celebrated for his philological labours, which reflect lustre on his name. His works are held in the highest estimation by the Jews, who maintain that there is no true science without Kimchi. Most of his commentaries have been incorporated in the great bibles of Venice and Basil; and Pfeiffer, in the "*Critica Sacra*," remarks, that his grammar is like the Trojan horse, from which crowds of Christian grammarians have issued forth, of whom those have shewn themselves most learned who

have been most perfectly acquainted with Kimchi. He took a decided part in the controversy concerning the writings of Maimonides, and so far moderated the temper of the contending parties, as to produce a revocation of the sentences of excommunication on both sides. It is not known at what particular period he died. His commentaries extend to the greater number of the books of the Old Testament, and from the bibles of Venice and Basil have been transplanted into the labours of Catholic and Protestant commentators, and have unquestionably afforded much valuable assistance in illustrating the true sense and meaning of the Hebrew text. Kimchi's philological works consist of a Hebrew Grammar, called "The Book of Perfection;" and of a Hebrew Dictionary, intitled "The Book of the Roots." They were first published at Constantinople, but have been several times reprinted. Buxtorf made these works the foundation of his "Thesaurus Linguae Hebraeae;" and his "Lexicon Linguae Hebraeae." Several of Kimchi's letters may be found in a volume of "The Letters of Maimonides," published at Venice in the year 1545.

KIMÉDY, in *Geography*, a town of Hindoostan, in the circar of Cicacole; 30 miles N.W. of Cicacole.

KIMI. See KEMI.

KIMITO, a town of Sweden, in the government of Abo; 23 miles S.E. of Abo.

KIMKIM, a town of Walachia; 55 miles N. of Bucharest.

KIMLASSA, a town of Hindoostan, in the country of Malwa; 35 miles S. of Chanderee. N. lat. 24° 15'. E. long. 78° 42'.

KIMMOO. See KEMMOO.

KIMMOUL, a town of Hindoostan, in Orissa; five miles N. of Sonepouur.

KIMNIK, a town of Walachia, on the Alaut; 44 miles E.S.E. of Tergovita.

KIMOS, a lake of Ruffia, in the government of Olonetz; eight miles N.W. from lake Nuk, which it communicates by a small river. N. lat. 64° 45'. E. long. 30° 14'.

KIMOSSES, or QUMOSSES, a name given in the language of Madagascar to a race of pigmies, or human beings of a diminutive size, who inhabit the interior parts of the island, and there form a considerable national body. M. de Commerçon, cited by M. Rochon in his "Voyage to Madagascar," gives the following account of them: "The natural and distinctive character of these little men is to be white, or, at least, of a paler complexion than all the different blacks ever known, to have very long arms, so that their hands reach below the knee, without bending the body; and that of the women, to have scarcely any breasts, except when they nurse their infant offspring; so that many of them are obliged to have recourse to cow's milk, for feeding their new-born infants. As to intellectual faculties, the Kimosses surpass all the rest of the Malegashes, who are known to be very ingenious and adroit, though abandoned to the greatest indolence; but the Kimosses are more active, and also more warlike; so that their courage being, as it were, double in proportion to their size, their neighbours have not been able to oppress them, they have attacked them by a superiority of number amounting to 10 to 1. Attacked as they have been by unequal weapons, (so that they do not use gunpowder and muskets, like their enemies,) they have always fought courageously, and supported their independence among their rocks, which being difficult of access, have, without doubt, contributed to their preservation. There they live upon rice, different fruits, vegetables, and roots, and rear great number of cattle, (bullocks with lunches on

their backs, and sheep with long, broad, fat tails,) which serve them as part of their food. They have no intercourse with the different tribes of Malegashes, who surround them, neither by trade, nor by any other method, because they derive all they want from the territory they inhabit. As all the little skirmishes or wars which take place between them and the other inhabitants of the island, have no other object than to carry off some cattle or slaves, the diminutive size of the Kimosses exempts them from the latter injury. In order to compromise the former, they contrive, when from the summits of their mountains they perceive preparations for war in the plain, to take all the superfluous cattle they can spare, and tie them to the openings of the defiles which must be passed by the enemy in penetrating into their mountains, of which, they say, they make a voluntary sacrifice to the indigence of their elder brethren; but they protest, at the same time, to fight to the last drop of blood, if they should penetrate further into their territories by force of arms. Their arms are the lance and the arrow, which they dart in the most masterly manner. At three days march from fort Dauphin, the natives shew, with great complaisance, little elevations of ground resembling graves, which owe their origin, as they affirm, to a great massacre of the Kimosses, who were defeated in the open field by their ancestors." M. de Commerçon says further, that he is able to certify, as an ocular witness, that in the voyage which he made to fort Dauphin, about the latter end of the year 1770, count de Modeve, the late governor, who communicated to him part of the preceding observations, gave him the satisfaction of shewing to him, among his slaves, a Kimoss woman, about 30 years of age, three feet seven inches high, whose complexion was one of the clearest and brightest he ever saw among the natives of the island. He remarked, that notwithstanding her low size, she was very strong-limbed, not resembling a slender diminutive person, but rather a woman of common proportion, her defect of height excepted; her arms were long, and reached, without flooping, the kneecap; her hair was short and woolly; her physiognomy tolerably good, and more like that of the Europeans than of the people of Madagascar. She seemed constantly to smile, her temper was sweet and complaisant, and she seemed, from the tenor of her conduct, to be possessed of much good sense. Her breasts were flat; but this circumstance of itself is far from being sufficient to establish an exception from the general law of nature. The desire of recovering her liberty, as much as the fear of instant embarkation, made the little slave escape by running away into the woods. This shortness of size, as Commerçon farther observes, compared with that of the Laplander, is almost graduated in both; the Laplander and the Kimoss inhabiting the most frigid zones, and the most elevated mountains on the globe. Those which form the retreat of the Kimosses at Madagascar, are from 16 to 18 hundred fathoms above the level of the sea. The productions of the vegetable kingdom, which naturally grow on these high mountains, seem to be abortive: e.g. the pine, the birch, and many other trees, appear like creeping bushes or shrubs. M. de Modeve also gives an account of this race of beings, who inhabit the centre of the island, in the 22d degree of latitude. The middling size of the men, he says, is three feet five inches, and they have a long round beard; the size of the women is somewhat shorter than that of the men. The Kimosses are thick and strong-limbed; the colour of their skin is less tawny than that of the other natives, and their hair short and woolly. They forge iron and steel, of which they make lances and arrows; which are the only arms they use. In other particulars he confirms the account already given of their mode of self-defence.

From

From other reports, he informs us, that the valley of the Kinoffes is rich in cattle and other provisions. Their dwarfs are laborious, and very good husbandmen. Their chief has an authority more absolute and more respected than that of the other chiefs of the different districts of Madagascar. The extent of the valley which they inhabit he was not able to ascertain; but he knew, that it was surrounded by very high mountains, and that its situation is 60 leagues N. W. from fort Dauphin, and westward it is bounded by the country of Mantanaa. Their villages are erected on little eminences, whose steep sides are the more inaccessible, since they have multiplied the obstacles which forbid approach to them.

**KIMOZERSKAIA**, a town of Russia, in the government of Olonetz, on the lake Kimos; 88 miles N. of Kemi.

**KIMPINA**, a town of Walachia; 36 miles S. of Cronstadt.

**KIMPOLUNG**, a town of European Turkey, in Moldavia; 116 miles W.N.W. of Jaffy. N. lat.  $47^{\circ} 42'$ . E. long.  $25^{\circ} 8'$ .

**KIMPOUR**, a town of Bengal; 27 miles E.N.E. of Purneah.

**KIMSLA**, a town of Sweden, in East Gothland; seven miles S.S.W. of Nordkioping.

**KIM-TCHA**, a town of Thibet; 15 miles W.N.W. of Tchaifiroong.

**KIM-TCHEOU**, a town of Chinese Tartary. N. lat.  $44^{\circ} 3'$ . E. long.  $126^{\circ} 26'$ .

**KIN**, a town of Persia, in the province of Segestan, situated at the foot of a chain of mountains near the lake Zurrah; the air is pure, and the soil of the environs fertile, especially in fruit; 127 miles W. of Candahar.—Also, a town of Arabia, in the province of Nedsjed; 153 miles N.E. of Hajar.

**KIN-bote**, compensation for the slaughter of a kinsman. See BOTE.

**KINAKINA AROMATICA**, in the *Materia Medica*, a name by which some authors have called the *cortex culebræ*.

**KINASKA**, in *Geography*, a town of Russia, in the government of Irkutsk; 28 miles W. of Nertchinsk.

**KINASSO**, a town of Africa, in Congo; 30 miles S.E. of Pango.

**KINATJURA**, a town of Japan, in the island of Nippon; 94 miles S.W. of Meaco.

**KINBURN**, a fortress of Russia, in the government of Ekaterinofslaf, on a bay of the Black sea, at the mouth of the Dnieper. It stands close to the frontiers, opposite the Turkish fortrefs Otchakov, which being a place of superior strength, must, while it continues in the hands of the Turks, obstruct, in case of a rupture, the navigation of the Dnieper. Kinburn was intended for the principal corporation of the merchandise sent from the provinces bordering on the Dnieper; but as the harbour, on account of its quick-sand, affords no security for anchorage, the town of Kherfon or Cherfon is at present the great emporium for trade; 16 miles S.E. of Otchakov. N. lat.  $46^{\circ} 35'$ . E. long.  $31^{\circ} 36'$ .

**KINCARDINE**, a town of Perthshire, Scotland, is seated on the banks of the river Forth, in a small tract of the county, which is nearly surrounded by Clackmannanshire. It was formerly called West-Pans, from the number of salt-pans used here. In 1780, there were 15, but at present these are reduced to two or three. The houses are mostly well built, and the streets assume a regular appearance. Here are two weekly markets, and several annual fairs. A valuable salmon-fishery is established on the Forth, at this place; and here is a commodious harbour: nearly opposite the town is an excellent roadstead, where 100

vessels, or more, may be anchored in safety. Ship building is carried on to a considerable extent, and vessels from 200 to 300 tons burden are often built here. In the year 1792, there were 75 vessels belonging to this port, to which were annexed 300 failors. In 1793, the town contained about 900 inhabitants.

**KINCARDINESHIRE**, or the county of Mearns, a district of Scotland, is surrounded by the counties of Aberdeen, Angus, and the British ocean. The area thus enclosed is nearly of a triangular form, and extends along the coast from the bay of Aberdeen, to the North-Elk river, an extent of about thirty miles; and from Dunnottar castle, to mount Batack, nearly 20 miles. The superficial contents of lands, are 191,575 Scottish, or 243,444 English miles. The sea-coast is partly flat, and partly rocky; at the north-eastern corner of the county, terminates the chain of Grampian hills. Here they run into the sea, and form what is called the Girdle-Neck, which present to the sea a bold face of rock, from 60 to 80 feet high. The northern part of this county consists of a mountainous territory formed by the tract of the Grampians, on the south of which is a low district, provincially termed the How or Hollow of the Mearns. On the southern side of the county, the surface is much diversified with hill and dale, particularly on the banks of the North-Elk, which separates this county from that of Angus, on the south. Here the continuation of the Sidlaw hills runs under different names, from the banks of the North-Elk, to the neighbourhood of Stonehaven, and bounds Strathmore on the south, or south-east. The line or valley of Strathmore, was the tract formerly pursued by all the invaders of Scotland, who, on account of the mountainous ridge between the two kingdoms, must either have entered by Berwick on the east, or by Dumfries on the west, where the mountains terminate before reaching the sea.

Among the Grampians, some are of very considerable height. That of the greatest altitude is mount Batack, in the parish of Strachan, which is said to be 1150 yards above the level of the sea. Kerlock, in the same parish, is 1890 feet high, and Kloachnabane 2370 feet. To the northward of the Grampians, only a small stripe, or spots and glens, of no great extent of cultivated land, are to be found in this county. The Grampian hills are either covered with heath or moss, and afford but very little pasturage. In the glacia and vallies, and on the sides and towards the bottoms of the hills, where cultivation has taken place, the soil is either light or gravelly, and full of small stones; but on the banks of the brooks and streams, loam commonly prevails. In the level part of the county, the soil is generally clay. That stripe of fine fertile land, lying along the sea-coast from North-Elk river, to Stonehaven, is chiefly a deep strong loam on a clay bottom, but in some places oblique clays occur. The soil in the valley of Strathmore is similar to that along the coast: but in practice it is found, that the clays in Strathmore do not carry beans, even after being properly limed; although the lands along the coast, when manured with lime, sea-weeds, or dung from the fishing towns, produce abundant crops; the reason of which seems to be, that in the interior part of the county the land is of a lighter nature, lying upon a cold clay. The coast land is a rich loam, fit for wheat and beans.

The mineralogy of this county is of no great importance. In many places, however, there are lime quarries; and as the stone is of the best quality, abundance of fuel only is wanting to render them of great value. They are wrought in the parishes of Ecclefraig, Laurencekirk, and others. In the parish of Arbuthnot, and on the sea-shore near St. Cyrus, beautiful pebbles and fine jaspers are found. A

great part of the coast, which is bold and dangerous, consists of rocks of that singular character called *Brecia*, or "plumb-pudding stone," having the appearance of loofe stones bound together by an artificial cement. In the north-easterly part of the county, near Aberdeen, granite quarries are wrought for exportation.

In this county is only one royal borough, Inverberrie, or Bervie; but there are several populous villages, of which Stonehaven, Johnhaven, and Laurencekirk, are the chief.

The principal rivers connected with this county, are those of the North-Esk on the west and south, and the Dee on the north. The other streams, which are but of little note, are called the Dye, the Cowie, the Carron, the Bervie, and the Luther.

The most remarkable remnant of antiquity in Kincardineshire, is Dunnotar castle. It stands on the eastern coast, on a rock projecting into the sea, accessible from the land on the west side, and that only by a narrow, steep, and winding path, over a deep gully, by which it is connected with the main land, and which serves as a kind of natural fosse or ditch, the adjacent rock having been scarped and rendered inaccessible by art. Here are various buildings and conveniences necessary for a garrison; such as chapel, barracks, a basin or cistern of water twenty feet in diameter, a bowling-green, and a forge, said to have been used for casting iron-bullets. On this rock, notwithstanding its difficulty of access, the church and burial-place of the parish were originally situated; the building now called the chapel being formerly the parish-church. In this castle, the regalia of Scotland, (the crown, sceptre, and sword,) were deposited in the year 1651, to preserve them from the English army, which overran this country during the civil wars of that period.

In the parish of Eccleferaig, are the ruins of a fortress, formerly a place of great strength, being erected on a perpendicular and peninsulated rock sixty feet above the sea. In the parish of Fettercairn is a ruined building, called Fenella's castle, said to be the place where Kenneth III. was assassinated. In Fordun parish a house still remains, called St. Palladius's chapel, where the image of the saint was kept, and to which pilgrimages were performed from the most distant parts of Scotland. In the parish of Arbuthnot, was born the celebrated Dr. Arbuthnot, physician to queen Anne. He formed a distinguished literary triumvirate with Mr. Pope and Dr. Swift.

In the population return to parliament in the year 1801, Kincardineshire was stated to contain 5990 houses, and 26,349 inhabitants.

**KINCHA**, a river of Asia, which rises in Thibet, passes through the Chinese province of Se-tchuen, and enters the province of Hou-quang, where it changes its name to Yang-tse, after which it crosses the province of Kiang-nan, and runs into the sea, N. lat.  $31^{\circ} 55'$ . E. long.  $112^{\circ} 44'$ .

**KINDELBRUCKEN**, a town of Saxony, in Thuringia, on the Wipper; 21 miles N.E. of Erfurt. N. lat.  $51^{\circ} 16'$ . E. long.  $11^{\circ} 10'$ .

**KINDERHOOK**, a post-town of America, in Columbia county, New York, on the E. side of Hudson's river, containing 50 dwelling-houses and a Dutch church; 13 miles N. of Hudson's city. The township contains 4248 inhabitants, of whom 483 are slaves. N. lat.  $42^{\circ} 25'$ . W. long.  $73^{\circ} 34'$ .

**KINDRED**, in *Law*, are a certain body of persons of kin, or related to each other. See ADMINISTRATION, AENATI, COGNATI, CONSANGUINITY, and DEGREES.

**KINE**, in *Zoology*. See BULL and COW.

**KINESCHMA**, in *Geography*, a town of Russia, in the government of Koltrom, on the Volga; 40 miles S.E. of Koltrom.

**KINETON**, or **KINGTON**, a market town and parish in a hundred of the same name, and county of Warwick, England, was formerly possessed by the kings of England, and it is said that Edward the Confessor, and William the Conqueror, held this town and manor. King John kept his court here, at a castle N.E. of the town. In the fourth year of king Henry III. Stephen de Legrave, obtained the king's charter for holding a weekly "Mercate," or market here on Tuesdays; and afterwards the same king granted an annual fair for two days. A church was built here about the beginning of Edward II.'s reign. In the year 1800, the town contained 165 houses, and 779 inhabitants. In the vicinity of Kineton, to the S.E. is Edge hill, where a signal battle was fought in the year 1642, between the armies of Charles I. and those of the parliament. Jago has commemorated the place, and the event, in an interesting poem, entitled, "Edge-hill." Dugdale's "Antiquities of Warwickshire illustrated," fol. 1656.

**KING**, a monarch, or potentate, who rules singly and sovereignly over a people,

Camden derives the word from the Saxon *cuning*, which signifies the fame; and that from *can*, *power*, or *ken*, *knowledge*, with which every monarch is supposed to be invested. The Latin *rex*, the Scythian *rex*, the Punic *resch*, the Spanish *rey*, the French *roy*, come all, according to Postel, from the Hebrew **מֶלֶךְ**, *resch*, *chief*, *head*.

Kings, both among the ancient Greeks and Romans, were priests as well as princes. Virgil, speaking of Anius, king of Delos, says,

"Rex Anius, rex idem hominum, Phæbique sacerdos."

As to the Romans, Livy and Dionysius are express; they say, that though Numa instituted a great number of orders of priesthood, yet some he discharged himself, and in person. After the expulsion of the kings, they were obliged to create a *rex sacrorum*, a king of the sacrifices, for the administration of the priestly part of the royalty.

Lawyers say, the king of England is a mixed person, a priest as well as a prince: at his coronation he is anointed with oil, as the priests and kings of Israel were, to intimate, that his person is sacred.

Among the Greeks, the king of Persia had anciently the appellation of the *great king*; the king of France lately had that of the *most Christian king*, and the king of Spain has that of *Catholic king*. See CATHOLIC.

The king of the Romans is a title formerly belonging to the emperor of Germany; but lately conferred on the infant son of Bonaparte.

The kings of England, by the Lateran council, under pope Julius II. had the title of *Christianissimus* conferred on them; and that of *defender of the faith* was added by pope Leo X. though it had been used by them some time before.

The title of *grace* was first given to our kings about the time of Henry IV. and that of *majesty* first to Henry VIII. before which time our kings were called grace, bigness, &c.

In all public instruments and letters, the king styles himself *nos, we*; though till the time of king John, he spoke in the singular number.

The Hungarians formerly gave the name king to their queen Mary, to avoid the infamy which the laws of that country cast upon those who are governed by women: accordingly she bore the title of king Mary, till her marriage

riage with Sigismund, at which time she took the title of queen.

By our laws the supreme executive power of these kingdoms is vested in a single person, the king or queen: for it matters not to which sex the crown descends: but the person entitled to it, whether male or female, is immediately invested with all the ensigns, rights, and prerogatives of sovereign power, as is declared by statute 1 Mar. tit. 3. c. 1. (See QUEEN.) As the executive power of the English nation is vested in a single person, by the general consent of the people, manifested by long and immemorial usage, it is become necessary to the freedom and peace of the state, that a rule, uniform, universal, and permanent, should be laid down, in order to make out, with precision, who is that single person, to whom are committed (in subservience to the law of the land) the care and protection of the community; and to whom, in return, the duty and allegiance of every individual are due. Accordingly our constitution has not left the decision of this important question dark or doubtful. It has marked out the right of succession in characters sufficiently obvious. See the article *Right of Crown*.

The king's title having been ascertained, the next point of principal importance is the assistance which the law has provided for him in the discharge of his duties, the maintenance of his dignity, and the exercise of his prerogative. For this purpose a diversity of councils has been established: for such are the high court of parliament, the peers of the realm, the judges of the courts of law, and more especially the privy council, generally called, by way of eminence, "the council." (See PARLIAMENT, PEERS, JUDGES, and PRIVY COUNCIL.) The next object of consideration will be the duties incumbent on the king by our constitution; with a view to which his dignity and prerogative are established by the laws of the land: it being a maxim in the law, that protection and subjection are reciprocal. (7 Rep. 5.) These reciprocal duties are, according to the statement of judge Blackstone, what were meant by the convention in 1688, when they declared that king James had broken the original contract between king and people. (See *Original Contract*.) The principal duty of the king is to govern his people according to law. "Nec regibus infinita aut libera potestas," was the constitution of our German ancestors on the continent. (Tac. de Mor. Germ. c. 7.) And this is not only consonant to the principles of nature, of liberty, of reason, and of society, but has always been esteemed an express part of the common law of England, even when prerogative was at the highest. "The king," says Bracton, (1. 1. c. 8.) who wrote under Henry III. "ought not to be subject to man, but to God, and to the law; for the law maketh the king. Let the king, therefore, render to the law what the law has invested in him with regard to others; dominion and power; for he is not truly king, where will and pleasure rule, and not the law." And again, (1. 2. c. 16. § 3.) "the king also hath a superior, namely, God, and also the law by which he was made a king." Fortescue, also having well distinguished between a monarchy absolutely and despotically regal, introduced by conquest and violence, and a political or civil monarchy, which arises from mutual consent, such as he supposes the government of England to be, lays it down as a principle, that "the king of England must rule his people according to the decrees of the laws thereof; inasmuch that he is bound by an oath at his coronation to the observance and keeping of his own laws." Moreover, it is expressly declared by statute 12 and 13 W. III. c. 2. "that the laws of England are the birth-right of the people thereof; and all the kings and queens who shall ascend the throne of this realm ought to admini-

ster the government of the same according to the said laws; and all their officers and ministers ought to serve them respectively according to the same; and therefore all the laws and statutes of this realm, for securing the established religion, and the rights and liberties of the people thereof, and all other laws and statutes of the same now in force, are ratified and confirmed accordingly." The terms of the original contract between king and people, the learned judge apprehends to be now couched in the *Coronation OATH*; which see.

In order to enable the king to maintain the executive power in due independence and vigour, and to discharge with honour to himself, and benefit to his subjects, the duties of his high station, the constitution and laws have invested him with a variety of prerogatives, some of which are *direct* and others *incidental*. (See PREROGATIVE.) The former, or direct and substantive prerogatives may be distributed into three kinds; such as regard, first, the king's royal character; secondly, his royal authority; and lastly, his royal income. These are necessary to secure reverence to his person, obedience to his commands, and an affluent supply for the ordinary expences of government. We shall refer to the article *Revenue*, what relates to the royal income; and here content ourselves with enumerating some particulars that pertain to the king's political character and authority; or, in other words, his dignity and regal power; to which last the term prerogative is frequently restricted. In order to exhibit and support the royal dignity, the law ascribes to the king, in his high political character, not only large powers and emoluments, which form his prerogative and revenue, but likewise certain attributes of a high and transcendent nature; by which the people are led to consider him in the light of a superior being, and to pay him that awful respect, which may enable him with greater ease to carry on the business of government. *First* of all, the law ascribes to the king the attribute of *sovereignty*, or pre-eminence. "Rex est vicarius," says Bracton, "et minister Dei in terra. Omnis quidem sub eo est, ipse sub nullo nisi tantum sub Deo." He is said to have *imperial dignity*; and in charters before the conquest, is frequently styled *basileus* and *imperator*, the titles respectively assumed by the emperors of the East and West. His realm is declared to be an *empire*, and his crown *imperial*, by many acts of parliament, particularly the statutes 24 Hen. VIII. cap. 12. and 25 Hen. VIII. cap. 28, which at the same time declare the king to be the supreme head of the realm in matters both civil and ecclesiastical, and consequently inferior to no man upon earth, dependent on no man, and accountable to no man. (See also 24 Geo. II. cap. 24. 5 Geo. III. cap. 27.) Hence it is that no suit or action can be brought against the king, even in civil matters; because no court can have jurisdiction over him. Hence it is likewise, that by law the person of the king is sacred, even though the measures pursued in his reign be completely tyrannical and arbitrary; for no jurisdiction on earth has power to try him in a criminal way; much less to condemn him to punishment. If any foreign jurisdiction had this power, as was formerly claimed by the pope, the independence of the kingdom would cease; and if such a power were vested in any domestic tribunal, there would soon be an end of the constitution, by destroying the free agency of one of the constituent parts of the sovereign legislative power. It may be asked, however, are the subjects of England totally delitute of remedy, in case the crown should invade their rights, either by private injuries, or public oppression? To this, says judge Blackstone, we may answer, that the law has provided a remedy in both cases. As to private injuries; if any person has, in

point of property, a just demand upon the king, he must petition him in his court of chancery, where his chancellor will administer right as a matter of grace, though not upon compulsion. (Finch. L. 255.) And this is entirely consonant to what is laid down by the writers on natural law. See Puffendorff's Law of Nature, b. 8. c. 10. Locke on Gov. p. 2. § 205.

As to cases of ordinary public oppression, where the vitals of the constitution are not attacked, the law hath also assigned a remedy. For as a king cannot misuse his power, without the advice of evil counsellors, and the assistance of wicked ministers, these men may be examined and punished. The constitution has therefore provided, by means of indictments, and parliamentary impeachments, that no man shall dare to assault the crown in contradiction to the laws of the land. As to such public oppressions as tend to dissolve the constitution, and subvert the fundamentals of government, these are cases, which the law will not, out of decency, suppose; being incapable of distrusting those, whom it has invested with any part of the supreme power; since such distrust would render the exercise of that power precarious and impracticable. The supposition of law, says judge Blackstone, is, that neither the king nor either house of parliament (collectively taken) is capable of doing any wrong; since in such cases the law feels itself incapable of furnishing any adequate remedy. For which reason all oppressions, which may happen to spring from any branch of the sovereign power, must necessarily be out of the reach of any *statute rule*, or *express legal provision*; but, if ever they unfortunately happen, the prudence of the times must provide new remedies upon new emergencies. It is found, indeed, by experience, that whenever the unconstitutional oppressions, even of the sovereign power, advance with gigantic strides and threaten dissolution to a state, mankind will not be reasoned out of the feelings of humanity; nor will sacrifice their liberty by a servile adherence to those political maxims, which were originally established to preserve it. And therefore, though the positive laws are silent, experience will furnish us with a very remarkable case in which nature and reason prevailed. When king James II. invaded the fundamental constitution of the realm, the convention declared an abdication, by which the throne was rendered vacant, which induced a new settlement of the crown. After all, it must be left to future generations, whenever necessity and the safety of the whole shall require it, to exert those inherent (though latent) powers of society, which no climate, no time, no constitution, no contract, can ever destroy or diminish.

II. Besides the attribute of sovereignty, the law also ascribes to the king, in his political capacity, absolute *perfection*. The king can do no wrong; by which ancient and fundamental maxim we are not to understand, that every transaction of government is of course just and lawful, but that whatever is exceptionable in the conduct of public affairs is not to be imputed to the king, nor is he answerable for it personally to his people; and farther, that the prerogative of the crown extends not to do any injury; it is created for the benefit of the people, and therefore cannot be exerted to their prejudice. (Plowd. 487.) In the king there is no folly or weakness; no injustice or error; and, therefore, if the crown should be induced to make an improper grant of any franchise or privilege, the law declares that the king was deceived in his grant, and thereupon such grant is rendered void, merely upon the foundation of fraud and deception, either by or upon those agents whom the crown had employed. Yet, notwithstanding this personal perfection which the law ascribes to the sovereign,

the constitution has allowed a latitude of supposing the contrary, in respect to both houses of parliament; each of which, in its turn, hath exerted the right of remonstrating and complaining to the king even of those acts of royalty, which are most properly his own; such as messages signed by himself, and speeches delivered from the throne; nevertheless, for the sake of freedom of debate, these acts of state are usually supposed to proceed from the advice of the administration. In the king likewise there can be no negligence or *laches*, and, therefore, no delay will bar his right: *nullum tempus occurrit regi*. (Finch. L. 89. Co. Litt. 90.) In the king also there can be no insanity, stain, or corruption of blood. By his crown he is, *ipso facto*, cleared of all attainder; no non-age or minority is allowed in him; and his very grants of lands, though held in his natural capacity, cannot be avoided by non-age.

III. Nay more, the law ascribes a kind of *perpetuity*, or *immortality* to him. *Res Anglie non moritur*. Henry, Edward, or George, may die; but the king survives them all. His death is termed his *demise*, because the crown is thereby demised to another. He is said not to be liable to death, being a corporation of himself, that lives for ever. There is no interregnum, but the moment one king dies, his heir is king, fully and absolutely without any coronation, ceremony, &c.

IV. To these it may be added, that the law attributes a kind of *ubiquity* to the king; he is in a manner every where, in all courts of judicature, which he alone has the right of erecting, and therefore cannot be non-suited. In the exertion of lawful prerogative, says judge Blackstone, the king is and ought to be absolute; that is, so far absolute, that there is no legal authority that can either delay or resist him. He may reject what bills, may make what treaties, may coin what money, may create what peers, may pardon what offences he pleases; unless where the constitution hath expressly, or by evident consequence, laid down some exception or boundary; declaring that thus far the prerogative shall go and no farther.

Some things there are which the king cannot do; *viz.* he cannot divest himself, or successors, of any part of his regal prerogative, authority, &c. There are several things also which he cannot do *salvo jure, salvo juramento, & salva conscientia sua*: in particular, there are two things which he cannot do without the consent of parliament; *viz.* make new laws, or raise new taxes.

In the exertion of those prerogatives, which the law has given him, the king is irrevocable, and absolute, according to the forms of the constitution, and yet, if the consequence of that exertion be manifestly to the grievance or dishonour of the kingdom, the parliament will call his advisers to a just and severe account. For prerogative confisting, as Mr. Locke has well defined it, (On Govern. 2. § 166.) in the discretionary power of acting for the public good, where the positive laws are silent, if that discretionary power be abused to the public detriment, such prerogative is exerted in an unconstitutional manner. Thus the king may make a treaty with a foreign state, which shall irrevocably bind the nation; and yet when such treaties have been judged pernicious, impeachments have pursued those ministers, by whose agency or advice they were concluded.

The king, with regard to foreign concerns, is the delegate or representative of his people; and as such, he has the sole power of sending ambassadors to foreign states, and receiving ambassadors at home. See EMBASSADOR.

The king has power, by his prerogative, without any act of parliament, to make war or peace, to conclude leagues, treaties, and alliances with foreign states, and to grant safe-conducts.

conducts. The king is considered as the generalissimo, or the first in military command, within the kingdom: and in this capacity he has the sole power to give commissions for raising and regulating fleets and armies, as well as for erecting, manning, and governing forts, and other places of strength, to appoint ports and havens, to erect beacons, light-houses, and sea-marks, to prohibit the exportation of arms or ammunition out of the kingdom, dispose of magazines, marts, ships, public moneys, &c. He convokes, adjourns, prorogues, and dissolves parliaments; and may refuse his assent to any bill passed by both houses, without giving his reasons for it.

In domestic affairs the king is considered as the fountain of justice and general conservator of the peace of the kingdom. However, by the fountain of justice the law does not mean the *author* or *original*, but only the *distributor*. Justice is not derived from the king, as from his *free gift*; but he is the steward of the public, to dispense it to whom it is *due*. (Bract. l. 3. tr. 1. c. 9.) In this capacity the king alone has the right of erecting courts of judicature; and all jurisdictions of courts are either mediately or immediately derived from the crown; their proceedings run generally in the king's name; they pass under his seal, and are executed by his officers. In early times, our kings, probably in person, often heard and determined causes between party and party. But by the uniform usage of many ages, they have delegated their whole judicial power to the judges of their several courts, which are the grand depositaries of the fundamental laws of the kingdom, and have gained a known and stated jurisdiction, regulated by certain and established rules, which the crown itself cannot now alter but by act of parliament. (2 Hawk. P. C. 2.) In criminal proceedings it would be in the highest degree absurd, if the king personally sat in judgment; because in regard to these he appears in another capacity, that of "prosecutor." But though the king is not personally present in his courts of law; yet he is understood to be virtually present; his judges are the mirror by which the king's image is reflected; so that it is the regal office, and not the royal person, that is always present in court, always ready to undertake prosecutions, or pronounce judgment, for the benefit and protection of the subject. See COURT and JUDGE.

As the king is the fountain of justice, the prerogative of issuing proclamations is vested in him alone. (See PROCLAMATION.) The king is likewise the fountain of honour, of office, and of privilege. Accordingly he is entrusted with the sole power of conferring dignities and honours, so that all degrees of nobility, knighthood, and other titles, are received by immediate grant from the crown; either expressed in writing, by writs or letters patent, as in the creation of peers and baronets; or by corporeal investiture, as in the creation of a simple knight. And as the king may create new titles, so he may create new offices, but with this restriction, that he cannot create new offices with new fees annexed to them, nor annex new fees to old offices; for this would be a tax upon the subject, which cannot be imposed but by act of parliament. (2 Inst. 533.) The king has also the prerogative of conferring privileges upon private persons; such as granting place or precedence to any of his subjects (4 Inst. 361.); such is also the power to enfranchise an alien, and make him a denizen. Such is likewise the prerogative of erecting *corporations*; which see.

The king is also the arbiter of commerce. Under this branch of the prerogative he has power to establish public marts, or places of buying and selling; such as markets and fairs, with the tolls belonging to them; and likewise to regulate weights and measures; to give money, which is the

medium of commerce, authority, or to make it current; and the coining of money is the act of the sovereign power, and the settling of the denomination or value for which the coin is to pass current. The king may also at any time decay or cry down any coin of the kingdom, and make it no longer current. Among the incidental prerogatives belonging to the king, and which are exceptions, in favour of the crown, to those general rules that are established for the rest of the community, we may mention the following. Debts due to him are always to be satisfied in the first place, in case of executorialship, &c., and till his debt is discharged, he may protect the creditor from the arrears of others. He may diltrain for the whole debt on a tenant that holds but part of the land; is not obliged to demand his rent as others are; may sue in what court he pleases, and diltrain where he lists. In all doubtful cases, *semper presumetur pro rege*: no statute restrains him, unless he be particularly named. In all cases where the king is plaintiff, his officers may enter with an arrest; and, if entrance be denied, break open a house, and seize the party; though in other cases a man's house is his castle, and has a privilege to protect him against all arrests. Moreover no coils shall be recovered against the king; and the king can remove a joint-tenant.

He has also custody of the persons and estates of idiots and lunatics; he is *ultimus haeres regni*, and to him revert all estates, when no heir appears. All treasure-trove (*i. e.* money, plate, or bullion, found, and the owners not known) belongs to him; so all waifs, estrays, wrecks, lands recovered from the sea, gold and silver mines, royal fishes, &c. belong to him. See REVENUE.

The king is considered by the laws of England as the head and supreme governor of the national church. (26 Hen. VIII. cap. 1. 1 Eliz. cap. 1.) In virtue of this authority, he convenes, prorogues, restrains, regulates, and dissolves, all ecclesiastical synods or convocations. See CONVOCATION.

He has the supreme right of patronage, called *patronage paramount*, over all the ecclesiastical benefices in England.

From this prerogative of being the head of the church arises the king's right of nomination to vacant bishoprics, and certain other ecclesiastical preferments. As head of the church, the king is likewise the "dernier resort" in all ecclesiastical causes; an appeal lying ultimately to him in chancery from the sentence of every ecclesiastical judge; which right was restored to the crown by statute 25 Henry VIII. c. 19. The king can unite, separate, enlarge, or contract the limits of bishoprics, or ecclesiastical benefices, and by his letters erect new bishoprics, colleges, &c. See REGALIA.

He can dispense with the rigour of the ecclesiastical laws, except those which have been confirmed by act of parliament, or declared by the bill of rights; as, for a ballard to be a priest, for a bishop to hold a benefice in commendam, &c. He has also power to dispense with several acts of parliament and penal statutes, by a non-obstante, where himself alone is concerned; to moderate the rigour of the law, according to equity; to pardon a man condemned by law; except in appeals of murder, and in case of impeachments by the house of commons; and to interpret by his judges, in statutes and cases not defined by law.

KING, *Champion of the*. See CHAMPION.

KING, *Charters of the*. See CHARTER.

KING, *Committee of the*. See COMMITTEE.

KING'S *Councils*. See KING, *supra*.

KING'S *Council*. See COUNSEL.

**KING'S Courts.** See COURT.

**KING'S Deaths, Comprising the.** See TREASON.

**KING, Peace of the.** See PEACE.

**KING, Quarantine of the.** See QUARANTAIN.

**KING, Revenue of the.** See REVENUE.

**KING, Succession of the.** See CROWN, Right of.

**KING, Tenant of the.** See TENANT.

**KING, Widow of the.** See WIDOW.

**KING of the Romans.** See ROMANS.

**KING**, among the *Hebrew Grammarians*, is an appellation given to a species of accents answering to our colon. See ACCENT.

**KING of the Mulletts.** See MULLUS *imberbis*.

**KING of the Quails.** See RALLUS *crex*.

**KING of the Sacrifices, rex sacrificulus, or sacrorum**, was a title of an ancient priest, or minister of religion, at Rome; who was superior to the *flamen dialis*; but inferior to the *pontifex maximus*.

He was created at the *comitia centuriata*, or assembly of the centuries, and was at first chosen out of the number of the patricians. He could not, during his office, hold any magistracy, nor harangue the people. He presided at all the sacrifices, proclaimed the feasts, &c.

His wife bore the title of *queen of the sacrifices, regina sacrorum*; and had herself a part in the sacred ceremonies.

**KING at Arms, or of Arms**, is an officer of great antiquity, and anciently he was of great authority; his business is to direct the heralds, preside at their chapters, and have the jurisdiction of armory.

The origin of this title is doubtful. Some of the French writers imagine that it was given to heralds because they attended upon and regulated military ceremonies. Others attribute to them the style of kings, because they governed and presided in ceremonies of tournaments, in like manner as the master of the ceremonies at Athens was styled *βουτλιας*. Others again ascribe the title to them, because in assigning arms, as expressions of honour to any person, they resembled the kingly prerogative. But this supposes that the custom of granting arms by the kings of heralds is as ancient as their titles: whereas Mr. Edmondson observes, in his "Complete Body of Heraldry," that it doth not any where appear that these kings had anciently the addition *armorum* given to them, they being then called, as they truly were, *reges heraldorum*; which for the most part continued till about the reign of Henry IV., when they began to be entitled *reges armorum*, although their primitive appellation was also used for some ages. The latter title of *reges armorum* was attributed to them before such times as those officers made any grant of arms.

Sir Henry Spelman is of opinion, that the title of king of arms was attributed to such officers in England as belonged immediately to the king's majesty; whilst those who appertained to princes of the blood royal, or to the nobility, were styled simply heralds. The most probable conjecture is, that this denomination "king of heralds," of later times called "king of arms," was given to that person who was the chief, or principal officer presiding over the heralds of any kingdom, or of any particular province, usually termed by heraldic writers "the marches," or of any order of knighthood; and owing its rise probably to the French dialect. Among the French, the word *roy*, or king, and from them in their and our histories and records, the Latin word *rex* hath been frequently referred to the principal, the governor, the judge, the visitor, the supreme, the president, or chief, of many professions, arts, or communities. In the most ancient writers, these officers are styled merely "kings of heralds," without the addition of any title of office; but

in course of time they became distinguished by the appellations of their different provinces.

In England we have three kings of arms; *viz.* Garter, Clarenceux, and Norroy.

**Garter, principal King at Arms.** See GARTER.

The two last are also called *provincial heralds*, because they divide the kingdom between them into two provinces, which are separated by the river Trent.

These, by charter, have power to visit noblemen's families, to set down their pedigrees, distinguish their arms, appoint persons their arms, and, with *Garter*, to direct the other heralds.

Anciently the kings at arms were created, and solemnly crowned, by the kings of England themselves; but of later days the earl marshal has a special commission, at every creation, to perfonate the king. See CLARENCEUX, and NORROY.

To these may be added Lyon King at Arms, for Scotland, who is the second king at arms for Great Britain; he is invested and crowned with great solemnity. To him belongs the publishing the king's proclamation, marshalling funerals, reversing arms, &c. And also Ulster, king of arms, in Ireland.

Ulster was substituted, as some say, in the room of Ireland king of arms, by Edward VI.; though the king himself in his journal takes notice of it as a new institution. "There was a king of arms made for Ireland," says he, "whose name was Ulster, and his province was all Ireland; and he was the fourth king of arms, and the first herald of Ireland." The patent passed under the great seal of England, with an ample testimony of the necessity and dignity of the office. Whether Ulster was substituted in the room of Ireland king of arms, or else was newly erected, such an officer of the crown of England, on which Ireland is dependent, still continues, and may execute his heraldic order in this kingdom, though out of his province, in as extensive a manner as either Clarenceux or Norroy may do without the limits of either of their marches. We here add, that each of the military orders of knighthood established in England, *viz.* the *Garter* and the *Bath*, give titles to kings of arms. Garter has been already mentioned. (See GARTER.) *Bath* king of arms was created in the eleventh year of king George I. for the government of the order of the "Bath," then newly created, by virtue of letters patent, bearing date at Westminster, May the 18th, in that year. In conformity to the statutes pertaining to this order, he was nominated and created, by the great master of the order, with the ceremonies usually observed in the creation of other kings of arms, to continue in his said office during good behaviour, denominated *Bath*, and enjoined sedulously to attend the service of the order. His habit and service are particularly prescribed. In the year 1725, his majesty, by sign manual, constituted and ordained, the then Bath king of arms, "Gloucester king of arms, and principal herald of the parts of Wales;" and letters patent passed the great seal, granting to him the said office of "Gloucester," empowering him to grant arms and crests to persons residing within the dominions of Wales; and also perpetually consolidating the office of "Gloucester" with that of "Bath" king of arms: ordering, moreover, that in all assemblies, and at all times, he should take precedence above and before all other provincial kings of arms. See COLLEGE of Heraldry, and HERALD.

**KING'S Band, in Musical History**, a royal household establishment. In the reign of king Edward IV. Music, after leading a vagrant life in our country, and being passed from parish to parish, seems at length, by the favour of this mo-

narch, to have acquired a settlement; for it appears by his letters patent, under the great seal of his realm of England, bearing date the 24th of April, 1469, in the ninth year of his reign, that this prince did incorporate certain minstrels, and give them a charter.

The original charter is preserved in Rymer's *Fœdera*: and in the eleventh year of Charles I., when that monarch was petitioned to grant a new patent to the professors of the art and science of music, the form of that which had been from Edward IV. was made the ground-work of the new charter. For a further account of this institution, see *CHAPEL Royal Establishment*.

The splendid robes and gorgeous attire of bards and minstrels at all times are upon record. The flowing vest of Orpheus in the triple capacity of priest, legislator, and musician, is specified by Virgil; Arion is related by Herodotus to have leaped into the sea in the rich vestments he usually wore in public; Suidas speaks of the saffron robe and Milesian slippers worn by Antigenides; and the performers in the tragic chorus, which used to be furnished at the expence of some wealthy citizen of Athens, wore also a splendid and costly uniform.

Indeed the custom of presenting state musicians with superb and expensive dresses during the fourteenth century, seems to have travelled into England from the continent, and to have continued here till after the establishment of the king's band of four-and-twenty performers; part of their present salary being still paid at the wardrobe-office, as an equivalent for the annual dress with which they used to be furnished at his majesty's expence. The children of the king's chapel still continue to wear the scarlet uniform of the original establishment. And the waits, or musicians who attend the mayor and aldermen of our cities and incorporate boroughs, are still furnished with splendid cloaks. See *MINSTRELS* and *WAITS*.

*King's Bench.* See *COURT of King's Bench*.

*King's Evil.* See *EVIL* and *SCROFULA*.

*King's Exchange.* See *EXCHANGE*.

*King's Household.* See *HOUSEHOLD*, *GREENCLOTH*, *CONFERER*, and *REVENUE*.

*King's Library.* See *LIBRARY*.

*King of the Minstrels, in Musical History.* Dr. Plot, in his History of Staffordshire, has minutely related the origin of an ancient and curious, though barbarous, privilege in favour of English minstrels, granted by John of Gaunt, duke of Lancaster, at his castle of Tutbury, in the year 1381, at the inauguration of the first king of the minstrels.

Du Cange gives several more early instances of minstrels having arrived at the honour of sovereignty in France: particularly Jean Charnillons, rex juglatorum at Troyes, in Champagne, 1296. Robert Cavaron, roi des menestriers du royaume de France, 1338; and others in 1357, and 1362. Copin de Brequin, roi des menestriers du royaume de France. *Computum de auxiliis pro redemptione regis Johannis, A. D. 1367.* Pour une couronne d'argent quil donna le jour de la tiphane au roi des menestriers. And one about six years later than John of Gaunt's institution is mentioned in Rymer, tom. vii. p. 555, where John Caunz, king of the minstrels, condescends to supplicate for leave to visit foreign countries.

“During the time in which ancient earls and dukes of Lancaster, who were ever of the blood royal, great men in their time, and had their abode, and kept a liberal hospitality here, at their honour of Tutbury, there could not but be a general concourse of people from all parts hither; for whose diversion all sorts of musicians were permitted likewise to come to pay their services; amongst whom, being numerous, some

quarrels and disorders now and then arising, it was found necessary, after a while, they should be brought under rules, divers laws being made for the better regulating of them, and a governor appointed them by the name of a *king*, who had several officers under him to see to the execution of those laws, full power being granted them to apprehend and arrest any such minstrels appertaining to the said honour, as should refuse to do their services in due manner, and to constrain them to do them; as appears by the charter granted to the said king of the minstrels, by John of Gaunt, king of Castile and Leon, and duke of Lancaster, bearing date the 22d of August, in the fourth year of the reign of king Richard II., entitled “*Carta le Roy de Minstrales*,” which is as follows:

“John, by the grace of God, king of Castile and Leon, duke of Lancaster, to all them who shall see or here these our letters, greeting—Know ye, we have ordained, constituted, and assigned to our well-beloved the king of the minstrels in our honour of Tutbury, who is, or for the time shall be, to apprehend and arrest all the minstrels in our said honour and franchise, that refuse to do the services and minstrelly as appertain to them to do from ancient times at Tutbury aforesaid, yearly on the days of the Assumption of our Lady; giving and granting to the said king of the minstrels, for the time being, full power and commandment to make them reasonably to justify, and to constrain them to do their services, and minstrelries, in manner as belongeth to them, and as it hath been there, and of ancient times accustomed. In witness of which thing we have caused these our letters to be made patent. Given under our privy seal, at our castle of Tutbury, the 22d day of August, in the fourth year of the reign of the most sweet king Richard II.” For a further account of this establishment, see *BURNEY'S General History of Music*, vol. ii. p. 361, &c. and the article *MINSTRELS*.

*King's Palace.* The limits of the king's palace at Westminster, extend from Charing Cross to Westminster Hall, and shall have such privileges as the ancient palaces. (23 Henry VIII.) If any person shall strike another in the king's palace, he shall have his right hand cut off, be imprisoned during life, and also be fined. 32 Henry VIII. cap. 12.

*King's Prerogative.* See *PREROGATIVE*, and *KING*.

*King's Privy-council.* See *PRIVY-COUNCIL*.

*King's Seal.* See *SEAL*.

*King's Silver,* the money due to the king in the court of common pleas, *pro licentia concordandi*, in respect of a licence there granted to any man for levying a fine of lands, or tenements, to another person. See *FINE*.

*King's Spear,* in *Botany.* See *ASPHODELUS*.

*King's Thanes.* See *THANES*.

*King's War.* See *WAR*.

*King's Wardrobe.* See *WARDROBE*.

*King-fish,* in *Ichthyology.* See *OPAH*.

*King-fisher,* *ispida,* in *Ornithology.* See *ALCEDO ispida*.

*King-piece,* in any *Buildings,* is a piece of timber standing upright in the middle, between two principal rafters, and having struts or braces going from it to the middle of each rafter.

*KING CHARLES I.* in *Biography.* See *CHARLES*.

*KING CHARLES II.* See *CHARLES*.

*KING of Prussia,* *FREDERIC.* Among German dilettanti in music, his late Prussian majesty is entitled to the first place, in talents as well as rank. This heroic and accomplished prince having had Quantz early in life for his matter on the German flute and in composition, played no other pieces than his own and those of his matter, which were never allowed

allowed to be printed. His majesty, during more than forty years of his busy reign, when not in the field, allotted four hours a day to the study, practice, and performance of music. All the German masters allowed him the first place among dilettanti composers, as well as performers on the flute. Fischer, however, who was some time in his service before he first came to England, did not seem to like his musical productions, thinking them, even then, somewhat dry and old fashioned. This prince had certainly great professors in his service, though he was never partial to Emanuel Bach, the greatest of them all. His majesty, besides a great number of pieces for the flute, and some for the harpsichord, composed sometimes for the voice; particularly in the pastoral opera of "Galatea et Alcides," in 1747, of which the overture and recitatives were Graun's, and the airs by the king jointly with Quantz and Nibelmann. Sometimes, the day before performance, his majesty would send a new song to the maestro di cappella to be introduced in an opera, and this was universally believed to be his own production in all its parts. During the last years of his life, according to his chapel-master, Reichardt, his Prussian majesty having lost some of his front teeth, not only discontinued the practice of the flute, but his evening concerts, and became totally indifferent to music: a proof that his majesty's chief pleasure in the art was derived from his own performance.

**KING, CHARLES.** Of this choral musician, sir John Hawkins, who seems to have known him personally, gives the following account in the fifth volume of his history:

"Charles King, bred up in the choir of St. Paul's under Dr. Blow, was at first a supernumerary singer in that cathedral, for the small stipend of 1*l.* a-year. In the year 1704, he was admitted to the degree of bachelor in music in the university of Oxford; and upon the death of Jeremiah Clark, whose sister was his first wife, was appointed almoner and master of the children of St. Paul's, continuing to sing for his original stipend until the 31st of October, 1730, when he was admitted a vicar choral of that cathedral, according to the customs and statutes thereof. Besides his places in the cathedral, he was permitted to hold one in a parish church in the city, being organist of St. Bennet Fink, London; in which several stations he continued till the time of his death, which happened on the 17th of March, 1745. With his second wife he had a fortune of seven or eight thousand pounds, which was left her by the widow of Mr. Primatt, the chemist, who lived in Smithfield, and also in that house at Hampton, which is now Mr. Garrick's. But notwithstanding this accession of wealth, he left his family in but indifferent circumstances. King composed some anthems, and also services to a great number, and thereby gave occasion to Dr. Greene to say, and indeed he was very fond of saying it, as he thought it a witty sentiment, that "Mr. King was a very serviceable man." As a musician he is but little esteemed. His compositions are uniformly restrained within the bounds of mediocrity; they are well known, as being frequently performed, yet no one cares to censure or commend them, and they leave the mind just as they found it. Some who were intimate with him say, he was not void of genius, but averse to study; which character seems to agree with that general indolence and apathy which were visible in his look and behaviour at church, where he seemed to be as little affected by the service as the organ-blower."

**KING, WILLIAM,** organist of New college, Oxford, set to music Cowley's "Mistress," and published it with the following title, "Poems of Cowley and others, composed into Songs and Ayrs, with a Thorough-bass to

the Theorbo, Harpsicon, or Base-viol," fol. Oxford, 1668.

**KING, ROBERT,** bachelor in music, of Cambridge, 1696, one of the royal band of William and Mary. He composed several of the airs that were printed in the "Tripla Concordia;" as well as many of the songs that were published in the "Theatre of Music."

**KING, JOHN GLEN,** an English divine, was born in the county of Norfolk about the year 1732. He completed his youthful studies at Caius college, Cambridge, where he took his degrees of B. A. and M. A. in the years 1752 and 1763, and at subsequent periods he was admitted to the degree of D. D., and received a member of the Royal Society, and of the Society of Antiquaries. In 1764, he obtained the appointment of chaplain to the English factory at Peterburg. In this situation he was led to inquire into the ceremonies of the Russian church, which he continually saw practised, and determined to give a faithful description of the same in his own language. He accordingly published, in 1772, in a handsome quarto, illustrated with engravings, a work, entitled "The Rites and Ceremonies of the Greek Church in Russia; containing an Account of its Doctrine, Worship, and Discipline." In 1778, he wrote and published a letter to the bishop of Durham, containing some observations on the climate of Russia, and the northern countries, with a view of the flying-mountains at Zarsko Sello, near St. Petersburg. Soon after his return to his native country, he was presented to the rectory of Wormley, in Hertfordshire, in 1783, and 1786 he purchased the chapelry of Spring Garden, in which he officiated as preacher. While he resided at Peterburg, the empress of Russia had appointed him her medalist, and he was engaged in a medallic work at the time of his death, which happened Nov. 3, 1787, when he was about fifty-five years of age. Besides the works already mentioned, Dr. King was author of "Observations on the Barberini Vase," which are printed in the eighth volume of the Transactions of the Antiquarian Society. Gen. Biog.

**KING, PETER,** baron of Ockham, was born in the year 1669, at Exeter, of which city his father was a considerable tradesman. He was intended to succeed in the business, but having a strong inclination for reading, he purchased books, and spent all the time he could command in improving his mind. He was related to the celebrated John Locke, who, discovering the bent of his inclinations, advised that he should be sent to Leyden for literary improvement. At this period his attention was chiefly turned to theology, and in 1691 he published "An Inquiry into the Constitution, Discipline, Unity, and Worship of the Primitive Church, that flourished three hundred Years after Christ; faithfully collected out of the extant Writings of those Ages." In the first volume, only three of the subjects were treated on, and he afterwards published a second part on worship. The chief object of this work was to prepare the way for that comprehension of the dissenters within the pale of the established church, which the revolution was supposed likely to effect. After his return from Leyden, he was persuaded by Mr. Locke to make choice of the law for his profession, and he accordingly entered himself of the Inner Temple. He now employed all his powers in acquiring an extensive knowledge of the laws and constitution of his country, and obtained a reputation which introduced him into the house of commons in 1699. This situation he held during six successive parliaments, but his legal and political avocations did not allow him to abandon his former theological studies; but having been led by his inquiries to examine the origin of the Apostles' Creed, he published, in 1702, a volume, intitled "The History of the Apostles' Creed, with critical Observations

on its several Articles." Mr. King's employment as a lawyer increased with his general reputation, and in 1708 he was chosen recorder of London, and about the same time he received the honour of knighthood: in the following year he was appointed by the house of commons to be one of the managers on the trial of Dr. Sacheverel, and in 1712 he boldly appeared as gratuitous counsel for Mr. Whiston, on his prosecution for heresy before the court of delegates, and, in the end, obliged the bishops and civilians to desist. On the accession of George I. he was appointed to the lord chief justiceship of the common pleas, and was sworn of the privy council. In 1725, the judge was raised to the peerage by the style and title of lord King, baron of Ockham, in Surrey, and was created lord-chancellor in the room of the earl of Macclesfield: the labours of this high office being too great for his strength, in 1733 he resigned the seals, and in a few months afterwards, viz. July 1734, departed this life, leaving behind him a character of great virtue and humanity, and of steady attachment to civil and religious liberty. Biog. Brit.

KING, WILLIAM, a miscellaneous writer, born in London about the year 1663, was educated at Westminster school under Dr. Busby, whence he was removed to Christ-church college in Oxford. He took his degree of M. A. in 1688, and in that year made his appearance as an author in a refutation of Varilla's account of Wickliffe, in his "History of Heresies." About this time he began the professional study of the civil law, in which he took a doctor's degree, and obtained a large practice as advocate in Doctor's Commons. In 1694, he published, in answer to lord Moleworth's account of Denmark, his "Animadversions upon the pretended Account of Denmark," which were to highly approved by prince George of Denmark, that he was appointed secretary to the prince, afterwards queen Anne. In some subsequent years he published several works of the humorous kind, such as "A Journey to London," intended as a burlesque on Dr. Martin Lister's journey to Paris; and a satire on sir Hans Sloane and the Royal Society. His habits were now become adverse to every exertion of regular industry, he deserted all his professional prospects, and, in 1702, he accepted an offer to go to Ireland, where he had several appointments under government, by which he might have been fully employed, and derived wealth and even affluence. He returned to England in 1708, but by no means improved in his fortune, and retired to his student's place in Christ-church college, where he finished his largest poem in imitation of Ovid's Art of Love, and composed several other pieces. He closely connected himself with the Tory party, and wrote in defence of Sacheverel. He was concerned in the periodical paper, intitled "The Examiner;" and such were his services to his party, that he obtained the place of gazetteer; but the duties attached to the office were more than he liked to perform, and he resigned it in a short time. He died on Christmas-day, 1712. As a prose writer he is forgotten, but his account of ancient mythology was long a popular book in the schools. His works have been collected and published in three vols. 8vo., under the title of "Original Works in Prose and Verse." Biog. Brit. Johnson's Lives of the Poets.

KING, WILLIAM, a learned Irish prelate, was born at Antrim, in the province of Ulster, in the year 1650. From the grammar school, in which he had made great progress, he was sent to Trinity-college, Dublin, in 1667; here he was remarkable for his attention to the studies of the place, and took his degrees in 1670 and 1673, and in the latter of these years he was ordained deacon. In the following year he was admitted to priest's orders, and was patronized by Dr.

Parker, archbishop of Tuam, who appointed him his chaplain in 1676. From this period ecclesiastical honours and preferments began to flow rapidly upon him, till at length, in 1688, he was elected dean of St. Patrick's. He had already published three treatises on the controversy between the Papists and Protestants, and no sooner had the revolution taken place in England, than the dean became active in promoting the same establishment in Ireland, both before and after the landing of king James there in 1689. That prince, fully sensible of the dean's influence, and of the weight of his opposition, confined him twice in the tower of Dublin castle on that account. This did not prevent him taking the degree of D. D. the same year; but the Jacobite party continued to inveterate against him, that they threatened to take away his life, and actually made two or three unsuccessful attempts for the purpose. Upon the flight of king James into France, after the battle of Boyne, in the year 1690, and the appointment of a day of thanksgiving for the preservation of king William's person, the dean preached the sermon on the occasion, at St. Patrick's cathedral, and, in 1691, his zeal and activity in favour of the revolution were rewarded with the bishopric of Derry. He now published "The State of the Protestants in Ireland under the late King James's Government, &c." This treatise was so well received, that a third edition of it was called for in a few months, and bishop Burnet observes, that it was universally acknowledged to be as truly as it was finely written, referring to it, in the "History of his own Time," as a full and faithful account. When public tranquillity was restored, the bishop applied himself very diligently to the immediate duties of his pastoral care, and was exceedingly desirous of converting the Presbyterian party to the episcopal forms. With this view, he published, in 1694, a treatise, entitled "The Inventions of Men in the Worship of God:" this drew him into a controversy with Mr. Joseph Boyse, a dissenting minister of Dublin, which terminated without effecting the object which the learned prelate had at heart. In 1702, bishop King published at Dublin his celebrated work, entitled "De Origine Mali," which was reprinted the same year at London. The object of this work is to shew in what way the several kinds of evil with which the world abounds, are consistent with the goodness of God, and may be accounted for without the supposition of an evil principle. The bishop was attacked by Bayle, Leibnitz, and others, upon different parts of his work; but he did not make any public reply during his life-time, being unwilling to enter again into the lists of controversy. He was not, however, an inattentive observer of the arguments adduced against him, but left behind him a great number of MSS., in which he considered their several objections to his system, and laboured to vindicate it from the least cavil: the substance was afterwards given to the public. In 1702, Dr. King was translated to the archbishopric of Dublin, and, in 1709, he published a sermon, preached before the Irish house of peers, entitled "Divine Predestination and Fore-knowledge consistent with the Freedom of Man's Will," in which he maintained that the moral attributes of God were different from the moral qualities of the same name in man. This doctrine was attacked by Dr. John Edwards and Mr. Anthony Collins, to neither of whom did the archbishop reply, though he had prepared answers, which were found among his MSS. at his death. In the year 1717, archbishop King was appointed one of the lords justices of Ireland, and he held the same office in the years 1721 and 1723. He died in May 1729, when he had nearly completed his 79th year. He was a prelate of great learning, and steadily attached to the principles of the Revolution;

volution; zealous for the prosperity of the established church, to which he belonged; and of an unblemished and exemplary moral character. He was ambitious of the primacy of Ireland, which was refused him, under the pretence of his being too old to perform the duties of the office. This reason, it is said, was as little agreeable as the refusal itself; and when the new primate called upon him after his elevation, archbishop King received him in his own house, without rising from his chair, making this apology, in a sort of farcical manner, "My lord, I am certain your grace will forgive me, because you know I am too old to rise." After his death, the papers which he left were put into the hands of Mr. Law, afterwards bishop of Carlisle, who published a translation of his work "De Origine Mali," corrected and enlarged on the author's notes, to which were added two sermons on the Divine Preseience, and the Fall of Man, 2 vols. 8vo. Biog. Brit.

**KING**, or *Kin-yuen*, in *Geography*, a town of China, of the first class, in the province of Quang-li. N. lat. 24 21'. E. long. 108°.

**KING**, a town of Africa, in the kingdom of Cacongo; 40 miles S.E. of Essena.

**KING'S**, a maritime county of New York, in the United States, containing that part of the state that is bounded E. by Queen's county; N. by New York county; W. partly by Hudson river, and partly by the ocean; and S. by the Atlantic ocean, including Coney islands. This fertile tract of land, situated on the W. end of Long island, and separated from Staten island by the Narrows, serves very much to the supply of the New York market with butter, vegetables, fruit, &c. It is divided into six townships, and contains 5740 inhabitants, including 1479 slaves. Its chief towns are Brooklyn, and Flatbush.—Also, a county of Nova Scotia, comprehending the islands on the S.W. and S. sides of the basin of Minas. The rivers Habitant, Caniad, and Cornwallis, are navigable to some distance. The lands on these rivers afford arable and pasture soil; the rivers abound with fish; and in the basin of Minas are fine cod-fish, haddock, and different kinds of flat fish.

**KING'S**, or *Pearl Island*, a small island in the bay of Panama; belonging to Spain, and famous for its pearl-fishery. N. lat. 7 12'. W. long. 81° 36'.

**KING'S Bay**, a bay on the S.E. coast of Nova Scotia. N. lat. 44 32'. W. long. 59° 10'.

**KING'S Bridge**, a post-town of New-York, 15 miles N. of New York city. The bridge connects New York island with the main land.

**KING'S County**, a county of Ireland, part of the old district of Ophaley, which, having been confiscated in the reign of the first Mary, was called the King's county, and its chief town Philip's-town, in compliment to her husband, Philip II. of Spain. It has Weltmeath and Meath on the N.; Kildare and the Queen's county on the E.; Tipperary on the S. and S.W.; and part of Galway and Roscommon on the W. Its chief natural boundary is the Shannon, which separates it from Galway. The little Brosna and the Barrow serve, each of them, to mark its limits for a few miles. Its breadth, in the northern and broadest part, is 32 Irish miles (39 English), but it contracts very much as it stretches to the southward. In this part of the country it extends 34 Irish (43 English) miles from N. to S. It contains 282,200 acres, which make upwards of 440 square miles, equal to 453,370 acres, or 707 square miles English. There are 52 parishes and 25 churches, and, according to Dr. Beaufort, a population of about 74,500. The completion of the grand canal has, however, tended much to increase the population of this county. The only

mountains in it are the Sliebh-Dloom, in the S.E. which extend into the Queen's county. These run in a range of about 15 miles, having but one pass, called the gap of Glendine, which is very difficult of approach, steep and craggy, and not five feet wide. The soil in the northern part is mostly argillaceous, and requires a great deal of lime to make it arable. The rocks are red argillite and freestone, which intersect each other. In the centre there are various soils, light sandy loam, stiff yellow clay, gritty shallow gravel, and deep brown earth. In this part of the range the land is often fertile in pasture, and grazed throughout the year with numerous flocks of sheep and young cattle: limestone is thickly interperfed, and the bottom is a stiff clay, where abundant crops of corn are yielded. In another part we find a cold, spongy clay, and at the foot, where the declivity vanishes, a deep ir-reclaimable bog, which can be approached only in very dry seasons. The mineral productions of this mountainous district have not been yet ascertained. In the arable parts of the county, we are informed that the soil is not naturally fertile, and is only rendered so by manures, and proper attention to a rotation of crops. The quality of the soil is either a deep moor, or a shallow gravelly loam; the moist season being most favourable to the produce yielded by the latter, and the moors very productive in dry summers. There is every where abundance of lime-stone and lime-stone gravel, which is found the best manure. The pastures, though not luxuriant, are kind and fattening, and well adapted for sheep-walks, where numerous flocks are supported, the wool of which is abundant, and of a very fine quality. The coarsest pasture, which is the unreclaimed moor, is highly nutritious to young cattle. The surface is rather an uninterrupted flat, unfavourable to dairy husbandry, and the corn crops are principally oats and barley. In some parts, however, improvements in husbandry are attended to, in the raising of green crops, introducing artificial grasses, and drilling potatoes. Considerably more than a third part of the whole county is occupied by bog and mountain. The bogs, however, supply an abundance of most excellent fuel, which not only serves the inhabitants, but is sent by the canal to Dublin. They also yield, when calcined, an excellent and lasting manure, both for their own improvement and that of the high grounds. As there is a natural fall in many places, these bogs are very capable of being drained and reclaimed by lime-stone. Such land is fit for all the purposes of husbandry, and will be found more productive, either in pasture or tillage, than the general run of the best lands in the county. This reclaiming of bog is now pursued with much spirit in many parts; and nothing surely can be more gratifying than to behold rich carpets of white clover and trefoil in spots which had been dark and barren moor. These bogs have been lately furveyed by the direction of the commissioners for the investigation of bogs, and it is to be hoped that some extensive plan of drainage will be carried into effect. The mineral productions of the county are inconsiderable. Sir C. Coote, author of the Statistical Survey, mentions only manganese, iron ores in small quantity, ochre, marble, lime-stone, freestone, and potter's clay. There is a great scarcity of timber, except ornamental plantations, though the bogs afford abundant proof of its having once been an almost uninterrupted forest. The alder appears to have been a native of this county, and a few of them still rear their venerable tops in a park at Droughtville. This county is well watered. Besides the Shannon and the little Brosna, before mentioned, the greater Brosna, after winding through a great part of it, between pleasant banks, loses itself in the Shan-

non. There are also several small rivers, and some lakes, of which Lough Pallis and Lough Annagh are the largest; and the Grand Canal crosses the northern part of the county. Of the towns, Birr is the most considerable; but Philipstown is the county town. Tullamore is a pretty and thriving place. The county is represented in parliament by the two knights of the shire only; the boroughs of Philipstown and Banagher having been disfranchised by the Union. Coote's Statistichal Survey. Beaufort's Memoir.

**KING'S COURT**, a post-town of the county of Cavan, Ireland; 39 miles N.W. from Dublin.

**KING'S CREEK**, a river of Virginia, which runs into the Chesapeake. N. lat. 37° 20'. W. long. 76° 2'.—Also, a river of North Carolina, which runs into the Cangaree, N. lat. 35° 8'. W. long. 81° 40'.

**KING'S ISLAND**, an island in the East Indian sea, near the W. coast of Siam, about 51 miles in circumference. N. lat. 12° 18'. E. long. 98.—Also, a small island in Beering's straits. N. lat. 65° 2'. W. long. 168'.—Also, an island near the W. coast of North America, separated by Fisher's canal from the southernmost of Princess Royal's islands, and by Burk's canal from New Hanover; so called by captain Vancouver, after captain James King, of the British navy. It is about 33 miles in length, and rather more than six in breadth. Point Edward is the farthest point to the N. and point Waller to the S. N. lat. 51° 56' to 52° 26'. E. long. 232° 9' to 232° 43'.

**KING'S KEYS**, islets and rocks in the Spanish main, near the Mosquito shore. N. lat. 12° 42'. W. long. 82° 35'.

**KING'S POINT**, the N.W. extremity of the island of Sumatra; 15 miles W. of Acheen. N. lat. 5° 30'.

**KING AND QUEEN**, a county of Virginia, on Mattapony river, which separates it from king William's county. It is about 25 miles long and 20 broad, and contains 4499 free inhabitants, and 5380 slaves. At King and Queen, in this county, is a post-office.

**KING GEORGE**, a county of Virginia, between the Patowmac and Rappahannock rivers. It is 22 miles long and 14 broad, and contains 2762 free inhabitants, and 3957 slaves. In the court house is a post-office.

**KING GEORGE'S ISLANDS**, two islands in the South Pacific ocean, discovered by commodore Byron in 1765, and visited by captain Cook in 1773. The commodore's landing was opposed by the natives, when, a shot or two being fired, one man was killed, and the rest fled. The canoes were curiously wrought with planks, ornamented with carving, and the seams filled up by strips of tortoise-shell. They were about 32 feet long, very narrow, with bottoms as sharp as a wedge. Two of them were joined together laterally by strong spars, so that between them there was an interval of about six or eight feet; each had a mast, and the sail was neatly made of matting. The houses were low mean hovels, thatched with branches of cocoonut tree; but they were delightfully situated in a grove of stately trees. The cocoonut tree seemed to afford them almost all the necessaries of life; particularly food, sails, cordage, timber, and vessels for holding water. The shores appeared to be covered with coral, and the shells of large pearl oysters. The island was covered with scurvy-grass. The flesh water is good, but scarce, being furnished by very small wells, which are soon emptied, and as soon filled again. In one of the islands was a lake or lagoon, in which were observed two or three vessels, one of which had two masts, and some cordage aloft to support them. S. lat. 14° 35'. W. long. 149° 2'.

**KING GEORGE THE THIRD'S ARCHIPELAGO**, a group of islands in the North Pacific ocean, extending from N. to S. about

150 miles in length; about 15 miles broad towards the N. and diminishing to little more than a mile at the southern extremity. N. lat. 56° 10' to 58° 18'. E. long. 223° 45' to 225° 40'.

**KING GEORGE THE THIRD'S ISLAND**. See OTAFUTE.

**KING GEORGE THE THIRD'S SOUND**, a harbour on the S.W. coast of New Holland, discovered by captain Vancouver in 1791. In approaching it from the westward, it is the first opening that appears like a harbour eastward of Cape Chatam. The Eclipse islands are an excellent guide to the Sound, having between them and Bald-head some rocks on which the sea breaks with great violence. The port is safe, and easy of access any where between its outer points of entrance: Bald-head and Mount Gardner lying N. 62° E. and S. 62° W., 11 miles distant from each other. S. lat. 35° 5'. E. long. 118° 17'.

**KING GEORGE'S SOUND**, a name given by Captain Cook to Nootka found. See NOOTKA.

**KING WILLIAM'S ISLAND**, a small island in the East Indian sea, near the N. coast of the island of Poggy. S. lat. 2° 33'. E. long. 99° 43'.—Also, a small island in Dampier's strait, near the S. coast of the island of Waigoo. S. lat. 0° 32'. E. long. 130° 51'.—Also, a cape on the eastern extremity of New Guinea. S. lat. 6° 45'. E. long. 148° 5'.

**KINGDOM**, the dominion of a king. See KING and MONARCHY.

**KINGDOM**, among *Chemists*, is a term which they apply to each of the three orders or classes of natural bodies; *animal, vegetable, and mineral*.

**KINGDOM OF GOD**, or of Heaven, in the Gospel History, is a phrase, which, according to Dr. Campbell, has a manifest allusion to the predictions in which this economy was revealed by the prophets in the Old Testament, particularly by Daniel, ch. ii. 44, vii. 13, 14; by Micah, ch. iv. 6, 7; and by other prophets. To these predictions there is a manifest reference in the title ἡ βασιλεια τοῦ ΘΕΟΥ, or τῶν ΕΒΡΑΙΩΝ, or simply ἡ βασιλεια, given, in the New Testament, to the religious constitution which would obtain under the Messiah. In most cases βασιλεια answers to the Latin *regnum*. But this word is of more extensive meaning than the English, being equally adapted to express both our terms *reign* and *kingdom*. The first relates to the time or duration of the sovereignty; the second to the place or country over which it extends. Nevertheless, though it is manifest in the Gospels, that it is much oftener the time than the place that is alluded to; it is never, in the common version, translated *reign*, but always *kingdom*. Yet the expression, says Campbell, is often thereby rendered exceedingly awkward, not to say absurd. In order to prevent this misapplication of terms, βασιλεια ought sometimes to be rendered *reign*, and not *kingdom*. When it refers to the time, it ought to be rendered *reign*, and when to the place, *kingdom*. There are, however, a few passages in which neither of the English words can be considered as a translation of βασιλεια strictly proper. In some of the parables (Matt. xviii. 23.) it evidently means administration, or method of governing; and in one of them (Luke, xix. 12. 15.) the word denotes royalty, or royal authority, there being a manifest allusion to what had been done by Herod the Great, and his immediate successor, in recurring to the Roman senate in order to be invested with the title and dignity of king of Judea, then dependent upon Rome. Upon the whole, we may observe, that the phrases, *kingdom of God*, and *kingdom of heaven*, are synonymous; and that they sometimes denote the state of the blessed, and sometimes the gospel dispensation. Campbell's Prel. Diss. p. 136, &c.

**KINGHALE**, in *Geography*, a town of Africa, in Caecongo, situated on the Louisa. S. lat. 5° 20'. E. long. 12° 10'.

**KINGHORN**, a small sea-port town in the county of Fife, in Scotland, situated on the north bank of the frith of Forth, nearly opposite to the city of Edinburgh and port of Leith, from the latter of which it is about seven miles distant. Kinghorn is principally inhabited by fishermen and boatmen employed on the ferry, which is one of the chief routes of intercourse between the metropolis and the counties of Fife and Angus. The boats employed on the ferry are large, well built decked-boats; but-decked for carrying carriages, horses, and black cattle; and there are handsome small pinnaces for pleasure parties, and passengers who have no equipage or horses. The fares are regulated, and the conduct of the ferrymen superintended by the magistrates of Edinburgh, who punish offences and frauds upon passengers upon a summary complaint. In the middle of the frith is a small pleasant island, about a mile in circumference, called Inch-Keith, upon which is the ruins of an old castle, which was once a place of some strength. About the commencement of the present war some entrenchments were made, and guns mounted upon this island for the protection of the shipping in the Forth from any surprise, probably from the recollection of the daring but nugatory attempt of Paul Jones, during the American contest; but hitherto there has been no occasion to employ them. Inch-Keith, we believe, is the property of the city of Edinburgh.

**KINGIKSOK**, a town of West Greenland. N. lat. 61° 55'. E. long. 47° 40'.

**KING-KI-TAO**, a city and capital of Corea, situated in the province of King-ki, and the ordinary residence of the sovereign. N. lat. 47° 38'. E. long. 126° 41'.

**KI-NG-NAN**, a city of China, of the first class, in the province of Kiang-si, seated on the river Kan, which is difficult and hazardous of navigation, on account of its numerous rocks and currents, and which requires the assistance of persons provided in this city. The adjoining fields and valleys are agreeable and fertile; and the mountains are said to contain mines of gold and silver. N. lat. 27° 7'. E. long. 114° 32'.

**KINGROAD**, a part of the Severn below Bristol, from whence the outward-bound ships from that city take their departure.

**KINGS**, *Books of*, in *Scripture History*, two canonical books of the Old Testament, so called, because they contain the history of the reigns of Israel and Judah, from the beginning of the reign of Solomon, down to the Babylonish captivity. The first book of Kings contains the latter part of the life of David, and his death; the flourishing state of the Israelites under Solomon, his building and dedicating the temple of Jerusalem, his shameful defection from the true religion, and the sudden decay of the Jewish nation after his death, when it was divided into two kingdoms: the rest of the book is taken up in relating the acts of four kings of Judah and eight of Israel. The second book, which is a continuation of the same history, is a relation of the memorable acts of sixteen kings of Judah, and twelve of Israel, and the end of both kingdoms, by the carrying off the ten tribes captive into Assyria by Salmanassar, and the other two into Babylon by Nebuchadnezzar.

It is probable that these books were composed by Ezra, who extracted them out of the public records, which were kept of what passed in that nation. These are the only books which the Hebrews call "Malachim or Kings," though the two books of Samuel have been also mentioned

under this general title; and authors have enumerated four books of Kings, those of *Samuel* (which see) being the first and second. The four books contain the history of almost 600 years.

**KINGSBRIDGE**, in *Geography*, a small market town and parish in the hundred of Stanborough, and county of Devon, England, is situated on a branch of the Salcombe river, and, according to Rifdon, derives its name from the bridge, which connects it with Dodbrooke. The town is in general well built. A free-school was founded here by Mr. Crispin of Exeter, and has obtained some degree of reputation. The parish was returned, under the population act of 1800, as containing 155 houses, and 1117 inhabitants. Kingsbridge is distant from Dartmouth 10 miles, from Exeter 39, and from London 207. It has a weekly market on Saturdays, and three annual fairs. David Tolley or Tolbey, called by Leland Taveleus, an eminent Greek and Latin scholar in the time of Henry VIII., was a native of this town. Beauties of England and Wales. Polwhele's History of Devonshire, folio.

**KINGSBURY**, a township of America, in the county of Washington, and state of New York, situated on the bend of Hudson's river, on the N.E. side; containing 1659 inhabitants.

**KINGSCLERE**, a small market town and parish in the hundred of the same name, Hampshire, England, is situated on the edge of a chain of hills, 17 miles from Reading in Berkshire, and 55 from London. It is mentioned by Camden as being a considerable town, but is now of a mean appearance, and only remarkable for having been the residence of the West Saxon kings. The church is a small stuccoed building, with a low tower. This parish was returned in the year 1801 as containing 394 houses, and 1939 inhabitants, of whom 492 were employed in trade, principally in the malting line, which produces a considerable traffic with London. A weekly market is held on Tuesdays, and here are three annual fairs. It is probable that the palace of the Saxon sovereigns was connected with Freemantle Park, a short distance to the south, as that is known to have been a royal residence in the time of king John, and was in the possession of the crown so late as the reign of queen Elizabeth. The mansion has been lately pulled down, and the park ploughed up and converted into a farm. Beauties of England.

**KINGSEY**, a township of Lower Canada, N.W. of Slipton, adjoining on both sides of Nicolet river, having about 30 inhabitants.

**KINGSLAND CREEK**, a river of Virginia, which runs into James river. N. lat. 37° 24'. W. long. 77° 40'.

**KINGSTON**, or ESOPUS, a post-town of America, in New York, in Ulster county, on the west side of Hudson's river, six miles west of Rhinebeck, and on the east side of Esopus hill, or creek. In 1777, this town was burned by the British troops, under the order of general Vaughan. It has been since rebuilt on a regular plan, and contains about 150 houses, a court-house, gaol, a Dutch reformed church, and an academy. Its situation is pleasant, being surrounded by a spacious plain; 56 miles S. of Albany. N. lat. 41° 56'. W. long. 73° 56'. The township contains 4615 inhabitants.—Also, a township in Addison county, Vermont, containing 585 inhabitants.—Also, a post-town in Plymouth county, Massachusetts, on the western part of Plymouth bay, bounded northerly by Duxborough, and containing 1037 inhabitants. It was incorporated in 1707; 38 miles S.E. of Bolton.—Also, a post-town in Rockingham county, New Hampshire, on the road that leads from Exeter to Haverhill

Haverhill in Massachusetts; 6 miles from the former, and 12 from the latter. It was incorporated in 1694, and contains 785 inhabitants.—Also, a town, now “Conway-borough,” in Horry district, South Carolina, on the west side of Wakkamaw river, having an episcopal church, and about 36 houses; 41 miles N. by E. from George town.—Also, the chief town of Lenoir county, Newbern district, in North Carolina. It is a post town, situated on a beautiful plain on the north side of Neus river, and containing a court-house, gaol, and about 30 houses; 40 miles W. of Newbern.—Also, a township in Luzerne county, Pennsylvania, containing 752 inhabitants.—Also, a town of Upper Canada, at the head of the river St. Lawrence, on the north shore, opposite to Wolf island; occupying the site of old fort Frontinac, laid out in 1784, and now advanced to a considerable size. It has a barrack for troops, a house for the commanding officer, an hospital, several store-houses, and an episcopal church. About Kingston there are several valuable quarries of lime-stone, and the country in general is rather stony, though not detrimental to the crops. It is 200 miles S. of Montreal, and 150 N. of Niagara. Large vessels go no farther than this place; thence to Niagara, &c. stores and merchandise are conveyed in boats.—Also, a township of Upper Canada, being the fourteenth and uppermost in ascending the St. Lawrence. It is in the county of Frontinac, and lies partly open to lake Ontario.—Also, the capital of the island of St. Vincent’s, in the West Indies, and the seat of government. It lies at the head of a bay of the same name, on the south-west shore of the island, in St. George’s parish. N. lat. 13° 6′. W. long. 60.—Also, a town of Jamaica, in the county of Surrey, situated on the north side of a beautiful harbour, and founded in 1693, when repeated desolations by earthquake and fire had driven the inhabitants from Port Royal. It contains 1665 houses, besides negro-huts and warehouses. The number of white inhabitants, in the year 1788, was 6339; of free people of colour, 3280; of slaves, 16,659; total number of inhabitants, of all complexions and conditions, 26,478. It is a place of great trade and opulence. Many of the houses in the upper part of the town are extremely magnificent; and the markets for butchers’ meat, turtle, fish, poultry, fruits and vegetables, &c. are inferior to none. From comparative registers of mortality it appears, that since the furlounding country is cleared of wood, this town has been proved to be as healthful as any in Europe. Assize courts are held every three months in Kingston, for the county of Surrey. N. lat. 18°. W. long. 76° 33’.

·KINGSTON-UPON-HULL. See HULL.

KINGSTON-UPON-THAMES, a market town and parish in the hundred of Kingston, and county of Surrey, England, derives its name from having been a royal residence; and the adjunct is affixed to mark its situation, and distinguish it from other Kingstons. It is seated on the southern bank of the river Thames, at the distance of 11 miles from Westminster-bridge. In the fourth, fifth, and sixth years of king Edward II., this town sent members to parliament; and again in the forty-seventh of king Edward III. The corporation afterwards petitioned to be relieved from sending members, and the town then ceased to be a borough. Several valuable privileges and immunities were granted to Kingston by charters from kings John, Henry III., Edward III., and other subsequent monarchs. The corporation now consists of about sixty members. Here are one weekly market, and three annual fairs. In the year 1769, an act of parliament was obtained for separating the parish of Kingston and its dependant chapelrys of Richmond,

Moulsey, Thames-Ditton, Petersham, and Kew, into two vicarages and two perpetual curacies. In this town is Canterbury-house, a feat of the late Lord Dillon, near which is a very large barn, which has four entrances, four threshing floors, and is supported by twelve pillars: twelve waggons may be unloaded at once within its walls.

The historical annals of Kingston relate many interesting events, as having occurred here. In the year 838, a grand council was assembled at this place, and was attended by Egbert, first Saxon king of all England, his son Ethelwolf, and the principal nobles and bishops of the land; at the same, the archbishop of Canterbury presided. Other monarchs were crowned here, of which the following are specified by our ancient historians: Edward the Elder, crowned A.D. 900; his son Athelstan, in 925; Edmund, in 940; Eldred, or Eured, in 946; Edwy, or Edwin, in 955; Edward the Martyr, in 975; and Ethelred, in 978. Previous to the reign of Henry III. a castle was standing here, as that monarch, in the year 1264, marched out of London, and seized the castle of Kenington, or Kingston, which then belonged to Gilbert Clare, earl of Gloucester, and which is not mentioned in any subsequent period. In the civil wars of the seventeenth century, Kingston was again a place of public celebrity; for the first armed force is said to have been assembled here under the command of colonel Lusford, with a troop of 400 or 500 horse. The colonel was proclaimed a traitor, as having levied war against the parliament, and was apprehended. Respecting this event, and some other contemporaneous proceedings, the different party writers are very contradictory. In the month of October 1642, the earl of Essex was in this town with 3000 men under arms; and at several other times, during the parliamentary civil war, Kingston was possessed by both parties: but the townsmen were mostly in favour of the royalists. Leland states, that “many old monuments were founde yn the decayling doune from Come-Parke towards the galows;”—also, “fundation of waulles of houses, and diverse coynes of brasse, sylver, and gold, with Romayne inscriptions, and painted yerthen pottes; and yn one, yn cardinal Wolsey’s tyme, was founde much Romayne monecy of sylver, and plates of sylver to coyne, and masses to bete into plates to coyne, and chaynes of sylver.” The bishops of Winchester formerly had a hall here.

In the market-place is the town-hall, which was built in the time of queen Elizabeth. In this are held the Lent assizes for the county of Surrey; and in a room adjoining, the corporation hold their courts of assize.

Adjoining the town is an old mansion, called Ham-house, which was intended for Henry, prince of Wales, son of James I. It afterwards belonged to the duke of Lauderdale, who furnished it in a very expensive and gorgeous style. In the centre of the house is a large hall, surrounded with an open gallery. Some of the ceilings are painted by Verrio; and several rooms are ornamented with paintings by the old masters, among which are a few valuable portraits. In this house was born John, duke of Argyll, and his brother Archibald, who was also created duke, and made lord keeper of Scotland. The church of Kingston has some ancient parts. On its south side was the chapel of St. Mary, which fell down in the year 1730, and buried the sexton, his daughter, and another person, in the ruins. The daughter, however, was rescued alive, and succeeded her father. In the church are several monumental memorials, some of which are for persons of eminence. Near Kingston is a bridge across the Thames, said, by Mr. Lysons, “to be the most ancient on the river, except that of London. It is men-

tioned

tioned in a record of the eighth of Henry III." An act of parliament was obtained in the thirteenth year of George, for lighting and watching this town. In 1800, Kingston contained 682 houses, and 3793 inhabitants. Lyfons' Environs of London, vol. i. 4<sup>to</sup>. 1796.

**KINGSTOWN**, a town of Africa, in the kingdom of Kauror.

**KINGSTREE**, a post-town of America, in Williamsborough county, South Carolina; 180 miles from Washington.

**KING-TCHEOU**, a city of China, of the first class, in the province of Hou-quang, seated on the Yang-tse river. The district of this town has two cities of the second order, and eleven of the third class. It is surrounded with lakes, which contribute to render the land about it fruitful and pleasant. It is well-built and populous; and its trade is great. A wall divides it into two parts, one of which belongs to the Chinese, the other to the Tartars, of which the garrison consists. N. lat. 30° 28'. E. long. 111° 37'.

**KING-TE-CHING**, a village belonging to the district of Jao-tcheou in China, in which are collected the best workmen in porcelain, and as populous as the largest cities of China. It is reckoned to contain a million of inhabitants, who consume every day more than ten thousand loads of rice. It extends 1½ league along the banks of a beautiful river, with crowded buildings, and its streets are thronged with inhabitants; for a great number of whom it furnishes employment. The river in this place forms a kind of harbour, about a league in circumference, which accommodates a great number of barks. This village contains about 500 furnaces for making porcelain; and to those who approach it at night it appears like a large city on fire. Strangers are not permitted to sleep here, but they are required either to sleep in their barks, or with their friends. N. lat. 29° 25'. E. long. 116° 56'.

**KINGTON**, or **ΚΥΝΕΤΟΝ**, a small market town and parish in the hundred of Huntington, and county of Hereford, is situated on the Black Brook, under Bradnor mountain. A castle was constructed at this place, at a former period, for the defence of the marches; but the whole is now destroyed. The church is a very irregular structure, having a detached tower, with a spire of singular form. The town is in general well built, and has a free grammar school, erected and endowed by lady Watkins. The inhabitants of this parish, as ascertained by the act of 1801, amounted to 1424; the number of houses to 311. The principal manufacture is that of woollen cloth. Kington is distant from Hereford 20 miles, and from London 155. Here are four annual fairs, and a weekly market on Wednesdays. The markets immediately before Easter, Whitsuntide, and Christmas, are very considerable for corn, cattle, and cloth; and are equal to most fairs. On the summit of Bradnor mountain are the remains of a square entrenchment.

About two miles eastward of Kington are the ruins of Lyons-hall castle, a very ancient structure, of which scarcely any thing now remains but fragments of the outer walls; the castle having been demolished in the reign of Edward II. Beauties of England, vol. vi.

**KING-TONG**, a city of China, of the first class, in the province of Yun-nan, on the Pa-pien river. It is surrounded with very high mountains, in which, it is said, there are silver mines. The adjacent country abounds with rice, and the valleys are well watered. N. lat. 24° 30'. E. long. 100° 39'.

**KINGUA**, a town of East Greenland. N. lat. 62° 21'. E. long. 45° 26'.

**KING-WILLIAM**, a county of Virginia, between Mattapony and Pamunkey rivers. It is 47 miles long, and 15 broad, and contains 5744 free inhabitants, and 3311 slaves. At the court-house is a post-office.

**KINGWOOD**, a township in Huntingdon county, New Jersey, containing 2436 inhabitants, of whom 104 are slaves; 15 miles S.W. of Lebanon.—Also, the name of a small river of New Jersey.

**KING-YANG**, a city of China, of the first class, in the province of Chen-fi. N. lat. 36° 6'. E. long. 107° 20'.

**KING-YUEN**, or **KIN-YUEN**, a city of China, of the first class, in the province of Quang-fi. This city is built on the banks of a large river, and surrounded with lofty and craggy mountains. The valleys between these mountains are full of villages and forts, and in the rivers is found gold. Under its jurisdiction are two towns of the second order, and five of the third. N. lat. 24° 26'. E. long. 108°.

**KIN-HOA**, a city of the first class in China, in the province of Tehe-kiang, situated in the middle of the province, on the banks of a fine river; formerly distinguished both as to the extent and beauty of its buildings, but much injured by the attacks of the Tartars. It has eight towns of the third order in its district, situated partly in a level country, and partly among mountains. Rice grows plentifully, and the wine made of it is much esteemed. The inhabitants carry on a large trade in dried plums and hams, which are sent into all provinces of the empire. Near it are small shrubs, resembling jessamine, which produce tallow, that make very white candles. N. lat. 29° 16'. E. long. 119° 16'.

**KINIC ACID**, in *Chemiſtry*, is a peculiar substance, recently found in Peruvian bark, where it exists in combination with lime. We are indebted for the discovery to a Mr. Deschamps, apothecary at Lyons, who described the salt in the 48th volume of the *Annales de Chimie*. He obtained it by macerating the bark in cold water; afterwards evaporating the solution, and leaving it to crystallize. The crystals produced were equal to about 7 *per cent.* of the bark employed. He did not prosecute his inquiry further; and it was not until some experiments which were afterwards undertaken upon it by Vauquelin, that the salt in question was found to contain a new acid. The researches of this excellent chemist, however, appear fully to have established the fact; and he has denominated it the *kinic acid*, from the word *quinquina*, which is a name given by the French to the yellow kind of bark from which the salt described was extracted.

The kinat of lime, obtained by the foregoing process, is of a white colour, and crystallizes in plates. It is devoid of taste, dissolving in about five times its weight of water, at the temperature of 55°. Alcohol exerts no action upon it. By exposure to heat it is decomposed, and carbonat of lime and charcoal are the products. Its solutions are not altered by ammonia; but the fixed alkalis precipitate the lime. This also takes place with the oxalis and sulphuric acids. It appears to be composed of 90 acid, and 10 lime.

To procure the free acid, M. Vauquelin precipitated the lime by an oxalat, and afterwards concentrated the liquid by evaporation. It was of a syrupy consistence; and on being set aside to crystallize, was found, at the end of a week, to have undergone no change; but the moment he touched it with a glass rod, the whole mass assumed the form of divergent crystalline plates. The colour of the acid was of a slight brown; occasioned, probably, by the evaporation

poration having been carried too far. Its taste was extremely four; and there was also a bitterness in it, which might be owing to an imperfect separation of the other constituents of the bark. Exposure to the air effected no alteration upon it.

By heat, kinic acid is decomposed, and converted into charcoal. It combines with different bases; and with the earths and alkalis, produces soluble and crystallizable salts. On the nitrats of silver, mercury, and lead, no change is occasioned by it. *Annales de Chimie*, t. 59.

KINITS, in *Geography*, a town of Moravia, in the circle of Olmutz; 24 miles W. of Olmutz.

KINK-COUGH, in *Medicine*. See PERRUSSIS.

KINKS, in the *Sea Language*. When ropes are new, or too hard laid, they are apt in foldings to make turns, which are called kinks.

KIN-LI, in *Geography*, a town of Corea; 15 miles E.N.E. of Cou-fou.

KIN-MEN-LO, an island in the Chinese sea, near the coast of China, about 24 miles in circumference, of a triangular form. N. lat. 24° 30'. E. long. 118° 20'.

KINNAIRD'S HEAD, a promontory on the east coast of Scotland, forming the fourth boundary of the frith of Murray; supposed to be the "promontorium Taixalium" of Ptolemy. N. lat. 57° 58'. W. long. 1° 54'.

KINNARAS, or CINNARAS, in *Hindoo Mythology*, are male dancers in Swerga, or the heaven of Indra.

KINNBACK, in *Geography*, a small island on the west side of the gulf of Bothnia. N. lat. 65° 9'. E. long. 21° 30'.

KINNEGAD, a post-town of Ireland, in the county of Westmeath, province of Leinster. A kind of cheese, of a very inferior quality, made in this neighbourhood, is called Kinnegad cheese, from this town. It is 29½ miles W. by N. from Dublin.

KINNEL, in *Rural Economy*, a provincial term sometimes applied to a powdering tub or salting vessel.

KINNEYETO, in *Geography*, a considerable town of Africa, in the kingdom of Manding; about 24 miles N.E. of Kamalia. N. lat. 12° 55'. W. long. 5° 52'.

KINNOR, in the *Jewish Antiquities*. See CYNRA, and CHINNON.

KINO, in *Chemistry*, is an astringent substance, of a black colour, supposed to have been originally introduced into this country from Africa. It is commonly called a gum, but very improperly; for, as Vauquelin has remarked, it has neither the physical nor chemical properties characteristic of that class of vegetable products. According to Dr. Duncan, the kino now known in the shops is principally imported from Jamaica; and is an extract from the *coccoloba uvifera*, or *jujube grape*. It is nearly wholly soluble in hot water and hot alcohol, and chiefly consists of tannin in a particular state; which has the property of precipitating the salts of iron of a green colour, instead of black. With gelatine it forms a rose coloured coagulum. We are indebted to Dr. Duncan for the first description of its properties; and he has published the result of his observations in the *New Edinburgh Dispensatory*, p. 242. Vauquelin afterwards took up the subject; but the kino that his experiments were made upon, Dr. Duncan suspects to have been the product of some of the species of *eucalyptus*, particularly the *resinifera*; being the substance called *Botany Bay gum*, a quantity of which was some years ago imported into Europe. It differs from the kino of the *coccoloba* in being of a much finer quality. *Nicholson's Journal*, vol. vi. No. 24, p. 232—234.

KINO, in the *Materia Medica*, or "*Gummi rubrum astringens gambiense*," the gum resin of a non-descript

African tree. Although the tree, from which this resin is obtained, is not yet botanically ascertained, it is known to grow on the banks of the river Gambia in Africa. The first account of this drug is related by Moor in his "*Travels into the interior Parts of Africa*," ed. 2. p. 113, by which we learn, that in wounding the bark of this tree, the fluid kino immediately issues drop by drop, and by the heat of the sun is formed into a hard mass. This, which was for some time considered as a species of *Sanguis draconis*, was afterwards fully explained, and its medical character established, by Dr. John Fothergill. (*Med. Obs. and Enq. vol. i.*) Kino has a considerable resemblance to Catechu, but redder, and is more firm, resinous, and astringent. It is now in common use, and is the most efficacious vegetable astringent, or styptic, in the materia medica. The "tincture of kino" is prepared by macerating three ounces of kino powdered in two pints of proof spirit, for 14 days, and straining it. All the astringency of kino is included in this preparation. The dose is from one fluid-drachm and a half to two fluid-drachms. The "compound powder of kino" consists of 15 drachms of kino, half an ounce of cinnamon bark, and a drachm of hard opium, which are to be reduced separately into a very fine powder and then mixed. This astringent powder was first introduced into the London Pharmacopoeia in 1809; the proportion of opium contained in it being one in twenty. The dose is from five gr. to ʒj.

KINOGAM, in *Geography*, a river of Canada, which runs from lake Wiakwa to the river Saguenay. N. lat. 48° 34'. W. long. 71° 31'.

KINOLLI, a town of Asiatic Turkey, in Natolia, in the coast of the Black sea; 16 miles N.W. of Sinob.

KINOSA, Str., an island in the Grecian Archipelago. N. lat. 36° 53'. E. long. 25° 34'.

KINROSS, the chief town of a small county of the same name, bordering N.E., E., and S. upon Fife, and the other part on Perth, in Scotland. The number of inhabitants of this county in 1801 was 6725, of whom 888 were employed in trade and manufactures, and 667 in agriculture. Kinross is a small town of little consequence, excepting as a market for the neighbouring country. It is situated on the border of Lochleven, a fine fresh water lake, with two small islands in it, on one of which is a castle, which was one of the many places in which the unfortunate Mary Stewart, queen of Scots, was confined, and from which she effected her escape. The lands near Kinross, like those of the adjoining counties of Fife and Stirling, are fertile and well cultivated. The county returns a member to parliament alternately with the small island of Clackmannan. The town was formerly famous for its cutlery; but the chief manufacture now is Silesia linen. In 1801, the number of inhabitants was 2124, of whom 394 were employed in trade and manufactures; 18 miles N.N.W. of Edinburgh. N. lat. 56° 13'. W. long. 3° 25'.

KINROSS-SHIRE is a small inland county in the northern part of Scotland. The ancient shire of this name was divided, about the year 1426, into the two counties of Fife and Kinross; and at the revolution Kinross, being thought too small a county as it then stood, was enlarged by the addition of Orwell, Cleith, and Tillibole; which parishes, before that period, were part of the county of Fife. But though these are now two distinct counties, and are separately represented in parliament, they are both comprehended in the sheriffdom of Fife. Kinross-shire is bounded on the east and south by Fife-shire, and on the north and west by Perthshire. It extends, from east to west, from Foffaway church to Anchmore bridge, eleven miles; and from Kelly-bridge nearly due north to Damhead, about nine miles and a half.

a half. The general figure of the county is circular, though the line of its boundary is very irregular. That which limits with Perthshire measures twenty-one miles; but when taken in a right line is only about fourteen: the boundary with Fifeshire nearly twenty-eight miles, but in a straight line does not exceed nineteen. The county contains 78 square miles, or about 39,702 Scottish acres; comprehending one town, Kinross, with six other parishes; and was returned under the population act of 1801 as containing 1,409 houses, and 6725 inhabitants. The surface of the county is greatly varied. The middle portion occupies a situation comparatively low, and may be considered as a kind of plain slightly varied with gentle rising grounds. The boundaries, in every direction, are hilly, or formed of a higher land than the high or vale of Kinross, with a single exception, at the narrow passage at the eastern extremity of the county, where the river Leven issues from the celebrated loch of that name. The Ochil hills form the northern boundary of Kinross-shire; the Cleith hills, the southern; and Balnearthie hill, with West Lomond, or Bishop's hill, as it is called, bound it on the east and south-east quarters. The sides of these hills, which form the central part of the county, are for the most part excellent pastures, generally retaining beautiful verdure; patches of moorland occurring only near their summits. In the interior and higher part of the Ochils, however, heath becomes more abundant. The chief variety in the appearance of the low grounds is produced by the mixture of corn and grass-lands, and by a few thriving plantations interspersed with villages. Some intervening morasses, and extensive moors, likewise variegated the surface. Even the margin of Lochleven is ornamented in this way by a common moor of more than 300 acres, in the vicinity of the town of Kinross, in the very centre of the county. The aspect of the whole shire is open and exposed, there being but a small part inclosed, and many of the inclosures formed not of hedges but of stone walls.

Of the waters of this county, the most remarkable is the lake called Lochleven, on the western banks of which stands the town of Kinross. This lake, though inferior in magnitude and grandeur to Lochlomond, is a noble expanse of fresh water, about fifteen miles in circumference, including its angular juttings, and covering nearly 3300 acres. The surface of the water at its highest rise and lowest fall, varies about three feet. Lochleven is bounded on the east by the Lomond hills, on the south by that of Balnearthie, and on the west by the plain of Kinross. It is remarkable for producing trout of a large size with flesh of a reddish colour, nearly approaching to the taste and appearance of salmon. Some of them weigh from two to eight, and even ten pounds each. The high colour of these trout is ascribed to the great quantity of small red shell-fish which abounds at the bottom of the loch; the trouts have often their stomach full of them. Lochleven receives the waters of three small rivers; Gairny, the southernmost stream in the county, South Queech and North Queech, which both have their rise among the Ochil hills. Lochleven gives rise to the river Leven, which passes through a considerable part of Fifeshire into the sea, forming the largest water in that county. In September, the eels, which greatly abound in Lochleven, begin to emigrate in great numbers to the sea; but only attempt this passage during the night. The county contains several small lakes; of these four are in the parish of Cleith: the largest is about a mile and a half in circumference: the four cover about 250 acres. The climate in the higher grounds of this county is cold and wet; owing to the elevation of the land, and chiefly to the hills, which attract the clouds and vapours. Frost sets in earlier, and

continues longer, than in the adjacent districts towards the south. The county is well intersected with roads, which are, in general, kept in excellent repair by the stature labour. The carriages and the personal duty may be furnished in kind, or commuted, at the option of the persons chargeable. The principal turnpike roads are those from Perth to Queensferry, and from Stirling to Kinross: they are kept in the highest preservation.

Of the antiquities of Kinross-shire, those connected with Lochleven are the most remarkable. The castle of Lochleven, now in ruins, stands upon an island of about two acres in extent. The circuit of the outer rampart is 585 feet. This castle is said to have been built by Congal, son of Dongart, king of the Picts: but it has been rendered particularly conspicuous in Scottish history, by the confinement of the unfortunate queen Mary. In the largest island of the lake was formerly situated a priory dedicated to St. Serff, or Servanus; and said to have been founded by Brudo, the last but one of the Pictish sovereigns.

KINSALE, a sea-port and post-town of the county of Cork, Ireland. It is situated at the mouth of the river Bandon, which forms a fine harbour, and is navigable for large ships near 12 miles above the town, though a bar prevents large men of war from coming into the basin. In this port there was formerly a dock furnished with stores for the use of the navy, but this has lately been removed to the neighbouring harbour of Cork, where the accommodations are greater, and which is the chief naval station in Ireland. The entrance of Kinsale harbour is defended by a fort, which having been constructed in the reign of Charles II. is called Charlesfort, in which there is always a good garrison. Kinsale is the town which the Spaniards took possession of, and in which they were besieged and taken prisoners, at the latter end of queen Elizabeth's reign. The town, which contains at least 10,000 inhabitants, is built at the side of Compass hill; the streets are narrow and the houses indifferent, yet in the bathing season it is the resort of much fashionable company, and there are at all times many genteel residents, so as to afford good society. Kinsale is represented by one member in the imperial parliament, who is chosen under the influence of the lord de Clifford, chief proprietor of the town. It gives title of baron to the descendant of the famous John de Courcy, who procured for himself and posterity the privilege of being covered in the king's presence. Kinsale is 136 miles S.W. from Dublin, and about 12 miles S. from Cork. N. lat. 51° 42'. W. long. 8° 30'.

KINSALE, *Old Head of*, a cape of Ireland, projecting a considerable way into the sea, and forming a very noted land mark. N. lat. 51° 37'. W. long. 8° 30'.

KINSALE, a post-town of Virginia, 16 miles from Westmoreland court-house, and 12 from Northumberland court-house.

KINSOMBA, a town of Africa, 25 miles S.E. of New Benuea.

KINTAL, or QUINTAL, a weight of one hundred pounds, more or less, according to the different usage of divers nations.

The kintal of Smyrna is 123 pounds three ounces nine drachms, or 120 pounds seven ounces 12 drachms; but that of Aleppo is 165 pounds 11 ounces 15 drachms.

KIN-TAM, in *Geography*, an island in the Chinese sea, near the coast of China, about 24 miles in circumference. N. lat. 30° 8'. E. long. 121° 24'.

KINTARRA, a town of Hindoostan, in the circar of Cicaele; 10 miles N. of Cessimotta.

KIN-TCHENG, a town of Corea; 80 miles E. of King-ki-tao.

**KIN-TCHIN**, a city and capital of the isles of Lieou-keiou. This city is situated in the S.E. part of the large island called "Cheou-li," where the court resides. The king's palace, which is reckoned to be four leagues in circumference, is built on a neighbouring mountain. It has four gates, which correspond to the four cardinal points; and that which fronts the west, forms the grand entry. The view which this palace commands is most extensive and delightful; it reaches as far as the port of Napa-kiang, at the distance of 10 lys, 200 lys making 60 geographical miles), to the city of Kin-tching, and to a great number of other cities, towns, villages, palaces, temples, monasteries, gardens, and pleasure-houses. N. lat. 26° 2'. E. long. 146° 25'.

**KINTEN**, a town of Prussian Lithuania; 15 miles S. of Memel.

**KINTORE**, a small borough town and parish of Aberdeenshire, Scotland, in the district of Garriwick, is feued on the river Don, at the distance of 15 miles N.W. of the county town, and 137 N. of Edinburgh. It is said that this place obtained a charter at an early period, but the only authentic deed of this description was granted by James V.; its government is vested in a provost, two bailiffs, a dean of guild, a treasurer, and a council of eight other burghesses. The first of these offices has long been veiled in the ears of Kintore. In this place are a town-house and a prison; and in the year 1800 it contained 198 houses and 846 inhabitants. In conjunction with Bamff, Cullen, Elgin, and Inverury, it returns one member to the British parliament. The parish of Kintore is about six miles in length by eight in breadth, and rises gradually from the river Don to a range of hills. In it is Thailone, the seat of Forbes Mitchell, esq. and in one part of it are several cairns and tumuli, which are traditionally said to mark the scene of an action between Robert Bruce, and the army of Edward I. Sinclair's Statistical Account of Scotland.

**KINTYRE**, or **CANTYRE**, one of the three districts of Argyleshire, in Scotland. Of the three districts or divisions of the county of Argyle, viz. Lorn, Knappdale and Kintyre, the latter is the most level and best adapted to the purposes of agriculture. It forms a long narrow peninsula, bordered by Lochfinc and the Firth of Clyde on the east side, and by the western sea on the west. Of this peninsula, by much the greatest part belongs to the duke of Argyle, who has a chamberlain or factor resident at Campbeltown, for the superintendance of this part of his estate. There is also a custom house at Campbeltown, for the regulation of the collection and prevention of frauds on the revenue, and some of the cruisers are generally on this station, for the detection and capture of smugglers. The loch or harbour of Campbeltown is excellently adapted for this, as from it a vessel of force can with ease command the whole shipping of the Clyde in moderate weather, and may board, over-haul, and inspect almost every vessel in the least suspected. The termination of the peninsula is called the Mull or Moyle of Kintyre.

**KINVACA**, a town of Africa, in Fooladoo. N. lat. 13° 10'. W. long. 6° 2'.

**KINURE POINT**, a cape of Ireland; in the county of Cork, at the entrance of Oyster haven, and about three miles east from Kinfales harbour.

**KINWAT**, a town of Bengal; 17 miles S.E. of Curuckpou.

**KINYALOO**, a town of Africa, in the town of Manding. N. lat. 12° 5'. W. long. 6° 5'.

**KIN-YANG**, a city of China, of the first class, in the province of Chen-li; which, being regarded as a barrier

against the incursions of the Tartars, is strongly fortified in the Chinese manner: the adjacent country is very fruitful; and produces a kind of herb, called "Kinfee," i. e. golden silk, to which is ascribed some medicinal virtue, and also a kind of bean which is said to be an admirable specific against any sort of poison. This city has in its district one town of the second order and four towns of the third order. N. lat. 36° 6'. E. long. 107° 19'.

**KINYAKOORA**, a town of Africa, in the kingdom of Gadou; 36 miles S.W. of Kamalia.

**KIOANON POINT**, called in some maps *Kikelones*, is the extremity of a large peninsula which projects far into the S. side of Lake Superior.

**KIO-PEOU**, a celebrated city of China, in the province of Chang-tong, which was the birth-place of Confucius. Several monuments are still to be seen there, erected in honour of this eminent man.

**KIOGE**, a sea-port of Denmark, situated on the island of Zealand, in a bay at the mouth of a river, formerly a place of considerable trade, with manufactures of valuable tapestry. In 1659, it was fortified by Charles Gustavus, king of Sweden, with ditches and ramparts; 10 miles S.S.W. of Copenhagen. N. lat. 55° 28'. E. long. 12° 12'.

**KIOLEN**, a town of Sweden, in Warmeland; 40 miles N.W. of Carlstadt.

**KIONGONG**, a town of Bengal; 30 miles N.N.E. of Burdwan. N. lat. 23° 41'. E. long. 88° 10'.

**KIONTONA**, an Indian town on Conewango river, in Pennsylvania; 11 miles N. from its mouth in the river Alleghany.

**KIOPING**, a town of Sweden, in Westmanland, on a river of the same name, communicating with Malar lake. It is a place of good trade; 10 miles W. of Stroomsholm. N. lat. 59° 33'. E. long. 16° 42'.

**KIORAH**, a town of Hindoostan, in Daggileund; 27 miles N.N.E. of Rewah.

**KIOREHVESI**, a town of Sweden, in Tavastland; 58 miles N. of Tavasthus. N. lat. 61° 56'. E. long. 24° 33'.

**KIOV**. See **KREV**.

**KIOVA**, a town of Africa, in the kingdom of Congo, and province of Sogno.

**KIOUMZEIK**, a well built town of Ava, situated on the Irwaddy, and gradually improving. The manufacture of cotton cloth is the source of its prosperity. A town called "Hinzaelah" near it, is of much greater antiquity; 76 miles N.W. of Rangoon. N. lat. 17° 42'.

**KIOZDI**, a town of Walachia; 77 miles N. of Bucharest.

**KIPE**, a kind of ozier basket, wide in the middle, and narrow at both ends; used for taking fish.

**KIPE** is also a game, which consists in throwing something into a hole, called the kipe-hole.

**KIPHANTA**, in *Geography*, a town of European Turkey, in the Morea; 20 miles E. of Militra.

**KIPPER**. See *Salmon FISHERY*.

**KUPPER-TIME**, a space of time between the festival of the finding of the Holy Cross, May the 3d and 12th day; during which, salmon-fishing in the river Thames, from Gravesend to Henley, is forbidden by Rot. Parl. 50. Edw. III.

**KIPPIS, ANDREW**, in *Biography*, an eminent nonconformist minister of the last century, was born at Nottingham on the 28th day of March, in the year 1725. He was defended, both by the father's and mother's side, from ejected ministers of the names of King and Ryther, who are mentioned with respect in Dr. Calamy's Account of the Ministers

Ministers ejected and silenced by the Act of Uniformity. Upon the death of his father, when he was about five years of age, he was removed to his grandfather at Sleaford in Lincolnshire, where he received his grammatical education. His talents and application attracted the peculiar notice of Mr. Merrivale, who was pastor of a congregation of dissenters in that town; and by his advice and encouragement, his views were directed to the profession of a dissenting minister, and to those literary pursuits in which he afterwards so much excelled. At the age of sixteen, he was admitted to the academy at Northampton, under the care of Dr. Doddridge; and in that seminary he prosecuted his studies with such diligence and improvement, and conducted himself with such exemplary propriety, as to conciliate the affectionate esteem and partial attachment of his tutor. Having completed his course of five years at the academy, he undertook the charge of a dissenting congregation at Boston, in Lincolnshire, with which he settled in September 1746. From Boston he removed to Dorking in Surrey, in 1750; and in 1753, he succeeded Dr. Hughes as pastor to the society in Prince's street, Westminster. In the same year he married Miss Elizabeth Bott, the daughter of a respectable merchant at Boston, in whom he found a sensible, prudent, sprightly, and cheerful companion, and by whose attentions his mind was relieved from all family concerns; so that he was left at full leisure to prosecute the various duties which his numerous engagements devolved upon him. Whether we consider the literary talents, the ministerial abilities, or the external accomplishments of the subject of this article, no person could have been better qualified for the situation into which he was introduced than himself. His settlement with the society in Westminster laid the foundation of that celebrity which he afterwards acquired, and of that extensive usefulness which distinguished his future life. He was thus soon introduced into a connection with the Presbyterian fund, to the prosperity of which he was afterwards very ardently devoted. In June 1762, he became a member of Dr. Williams's trust; and this appointment afforded him an additional opportunity of being eminently and extensively useful in a variety of respects. His connection with the general body of Protestant dissenting ministers, belonging to the cities of London and Westminster, and with many charitable institutions, which the liberality of dissenters has established, gave him frequent occasion to exercise his talents for the honour and interest of the cause, to which, both by his sentiments and profession, he was zealously attached.

His literary abilities and attainments were acknowledged by all who knew him. It was, therefore, natural to imagine, that when a favourable opportunity offered, he would be employed in the department of public education. Accordingly, when the death of the reverend Dr. Jennings rendered it necessary to make a new arrangement of tutors in the academy, supported in London by the funds of William Coward, esq. the trustees directed their views to him; and in the year 1763, he was appointed classical and philological tutor to that institution.

In 1767 he received the degree of doctor in divinity from the university of Edinburgh; an honour, in the unsolicited grant of which the principal and professors very cordially concurred. No one can dispute his peculiar claim to such a token of respect.

In March 1778, he was elected a fellow of the Society of Antiquaries; and in June 1779, a fellow of the Royal Society. He was a member of the council of the former society from 1782 to 1784, and of that of the latter from

1786 to 1787. In both these societies he was a regular attendant, and a respectable and useful member.

Having, in the year 1784, quitted his connection with Mr. Coward's academy, which, upon the resignation of the two other tutors, was discontinued, he cordially concurred with a very respectable body of dissenters, in 1786, in establishing a new institution in the neighbourhood of London, with a view of educating ministers and other young gentlemen intended for civil life. Dr. Kippis was very assiduous and active in his endeavours to accomplish this laudable design; and though his other engagements rendered it very inconvenient for him to accept any official connection with it, he was urged to unite with other persons, for whom he entertained a peculiar respect; and he at length, though not without reluctance, acquiesced in the appointment to be one of the tutors of this new institution. The distance of his residence from Hackney, where the college was fixed, and some other circumstances which it is unnecessary to recite, induced him in a few years to withdraw from it, as a tutor; though he still continued to serve it by a liberal subscription, and by his interest with opulent friends.

Dr. Kippis continued to prosecute his other useful labours without intermission; and till within a fortnight of his death, his friends had no reason to imagine that they were so near their close. In the course of the summer, a few weeks before his death, he took a long journey on public business, and returned, as his fellow travellers apprehended, with recruited spirits and established health; and they were equally surpris'd and grieved when they heard that he was confined to his bed with a fever, which baffled the skill of the most eminent physicians, and which hastily advanced to the fatal crisis. His disorder was of such a nature, that he found himself both disinclined and unable to make any exertion, or to converse much even with his most constant attendants. There is reason, however, to believe, that in a very early stage of his disorder he was not without apprehensions of its terminating in his dissolution. The last public service he performed was on the 20th of September; and on Thursday evening, the 8th of October, he awoke after a tranquil sleep of some continuance, and in a little while expired: having served his generation according to the will of God, and attained the age of 70 years and 6 months.

It is not easy to do sufficient justice to the eminent talents, the extensive labours, and exemplary character of Dr. Kippis.

His mild and gentle temper, his polished manners, his easy and graceful address, and a variety of external accomplishments, prepossessed those who first saw him in his favour, and could not fail to conciliate esteem and attachment on a more intimate acquaintance. These qualities contributed very much to recommend him to persons in the higher ranks of life, to several of whom he had occasional access; and qualified him, in a very eminent degree, for the situation in which he exercised his ministerial office. But he was no less condescending, courteous, and affable to his inferiors, than to those who occupied superior stations. Dr. Kippis had nothing of that austerity and reserve, of that haughtiness and superciliousness, of that parade and self-importance, and ostentatious affectation of dignity, which forbid access, and which mar the freedom and the pleasure of all the social intercourses of life. And yet these disgusting and odious qualities sometimes accompany literary men, and especially those who have acquired any considerable degree of eminence and reputation.

The mental abilities of Dr. Kippis were of the superior kind. He possessed a comprehensive understanding, a sound

judgment, a retentive memory, a correct imagination, a refined taste, a quickness and a facility of exerting his faculties on any subject or occasion, however suddenly they might occur.

The natural powers of his mind were cultivated with an assiduity and perseverance of application, in which he had few superiors, and not many equals. They had been habituated through life to regular and constant exercise, and had acquired strength and vigour from use. He was never hurried and distracted by the variety of his literary pursuits; and though he had many engagements which required his attention, and which diverted his mind from the objects of study to which he was devoted, he never seemed to want time. Every kind of business was referred to its proper season. By a judicious arrangement of his studies, as well as of his other occupations, the number and variety of which he never ostentatiously displayed, and by the punctuality of his attention to every kind of business in which he was employed, he avoided confusion; he retained on all occasions the possession of himself; and he found leisure for reading and writing, and for all his literary avocations, without encroaching on that time which he appropriated to his professional duties and social connections.

Indeed, there have been few persons, says his biographer, who read so much, and with such advantage to themselves and others, as Dr. Kippis. Hence he acquired that extensive acquaintance with books, and with the literature of ancient and modern times, and particularly of the last century, which rendered him an instructive companion, and which directed him where to apply for necessary information on any subject that employed his own attention or that of others. But though he read much, he was not one of those who waste their time in desultory reading, and who make no addition to their stock of useful knowledge by the volumes which they turn over for mere present amusement. He read with attention and discrimination. He formed an accurate judgment of the intrinsic value of every publication, to which he had recourse: and there have been few works, in the department of literature with which he was conversant, that have issued from the press, for many years, of the specific objects and real merit of which he could not give a just and satisfactory account.

There is one circumstance, to which it was principally owing that Dr. Kippis seemed, in the midst of a great number of engagements, to have time at his own command, and which enabled him to dispatch much business without apparent hurry and confusion.

We mention it here, for the direction of young persons, and especially of young students, whose habits are not established. He had been accustomed from his youth to early rising; and he thus secured to himself a certain portion of time, during which he was not liable to be interrupted by any foreign avocations. This habit was no less conducive to his health, than to the discharge of his various literary and professional obligations. Providence had blessed him with an excellent constitution. He had preserved it unimpaired by a course of uniform regularity and temperance. He was little interrupted through life by any bodily disorder in any of the occupations to which he was devoted. If we except a fever, which laid him aside for some years before his death, and a constitutional cough which was rather beneficial than injurious, he enjoyed an unusual share of health and spirits.

Dr. Kippis possessed other qualities, besides his mental abilities, however excellent, however assiduously cultivated, and however usefully employed, which rendered his character

in a still higher degree estimable and praise-worthy. In private life, his disposition and deportment were amiable and exemplary. His piety originated in honourable sentiments of the perfections and providence of God; and its practical influence was uniform and permanent. He exhibited, in all his connections and concerns, a humble, meek, placable, forgiving, and benevolent temper. The gentleness, mildness, and philanthropy of his disposition formed very distinguishing traits of his character. With these virtues, so congenial to the spirit of the religion he professed, so conducive to the tranquillity of his own mind, and so powerful as incentives to activity and usefulness, he united an inflexible integrity, and an independence of spirit, which disdained every thing that was mean, selfish, and servile.

If we accompany Dr. Kippis from private and domestic life into the various stations of public usefulness, which Providence assigned him, we shall find him eminently qualified, and ardently disposed to serve his generation according to the will of God. His knowledge of the world, the rectitude of his judgment, and the mildness of his temper, gave him considerable influence in various connections to which he belonged. At the Presbyterian Board, in Dr. Williams's Trust, and in the general body of associated ministers, his opinion always claimed peculiar deference. As he was become the father of several societies of this kind to which he stood related, his age commanded respect; and his condescending, complying disposition rendered it easy and pleasant to act with him on every occasion. Notwithstanding the variety of his engagements, he was a constant attendant. He never pleaded them as an apology for absence. He never wished to decline any public service, whatever personal inconvenience or trouble might attend it. He preferred the concerns of others, who needed his assistance, to his own.

As a scholar, the literature of Dr. Kippis was various and comprehensive. But the studies to which he principally applied, and in which he most excelled, were those of the classics, the belles lettres, and history; besides those which were immediately connected with his profession. The history of his own country had been the subject of his long and laboured investigation; and the principles of the British constitution he had diligently studied. To these he was zealously attached; and he ably defended them, though he was not unapprized of the corruption which time had introduced, and of the necessity and wisdom of a speedy reformation. He was a steady, uniform, and ardent friend to the cause of civil and religious liberty; and in the course of his life he had various occasions of avouching himself the advocate of this cause. But whilst he detested tyranny and oppression, he dreaded anarchy and tumult. In the political contests, which have lately agitated this country, the moderation of his temper was eminently conspicuous. His disposition was gentle and conciliating. He was an enemy to every species of violence; and he thought that calmness, firmness, and perseverance in the pursuit of constitutional measures, were the most likely means of obtaining a reformation of acknowledged abuses, and a termination to public calamities and evils. Though he thought it most prudent to withdraw from some societies of a political nature, with which he had been long connected, he never abandoned the principles upon which his first connection with them was founded; nor did he ever disguise his sentiments either of men or of measures, whenever a proper occasion for declaring them occurred.

In many other societies of a different kind, that were established for literary improvement or friendly intercourse,

Dr. Kippis was a very valuable and useful member. Whilt his modestly prevented his obtruding his sentiments on others, or assuming the lead, and presuming to dictate amongst those who were in various respects inferior to himself, he was always communicative and entertaining. He never offended either by an ungracious reserve and affected silence, on the one hand, or by an intrusive and troublesome loquaciousness on the other. His literary character was universally acknowledged by persons of this description, with whom his acquaintance was intimate and extensive. The course of his studies furnished him with a variety of anecdotes, that rendered his conversation, on particular occasions, interesting and instructive. His knowledge of books, and his judgment of their respective merit, which was always formed with candour and pronounced with modesty, were very comprehensive and accurate; and he was often appealed to by those who wished to obtain information on subjects of this nature. In those friendly associations to which he belonged, he was always placid and cheerful; placid without dulness, and cheerful without an unbecoming levity. In him were invariably united, the knowledge of the scholar, and the judgment resulting from experience and an attentive observation of the course of the world, with the manners of the gentleman, and the decorum belonging to his public character as a Christian, and his profession as a minister.

Amidst a variety of other occupations, Dr. Kippis sustained the office of tutor, for more than 25 years, with singular reputation to himself, and with great benefit to the young persons who were under his care. His lectures and his general conduct conciliated the esteem, and promoted the improvement of his pupils. They all honoured and loved him; for he had a happy talent of attaching their affection and respect. They lamented his removal from this sphere of public service. To young men, and particularly to young ministers, Dr. Kippis was always attentive and friendly. He was ready, on all occasions, to assist them with his advice in the prosecution of their private studies and public labours; and to those who needed pecuniary aid, his hand was extended for the distribution of his own property, as well as that of others entrusted to his disposal.

As an author, Dr. Kippis commenced his career in early life, as many other young men have done, by contributing to the magazines of the time, particularly the Gentleman's Magazine. He afterwards became a more constant writer in the Monthly Review. His articles were chiefly historical and theological, with occasional strictures on works of general erudition. He also furnished a periodical publication, called the Library, with several valuable papers. He laid the foundation of the New Annual Register; and suggested the improved plan upon which that work is conducted. The History of Ancient Literature, and the Review of modern Books, were, at its first commencement, written by him, and continued to the year 1784, inclusive. He was also the author of the "Review of the Transactions of the present Reign," prefixed to the Register for 1780; and of the "History of Knowledge, Learning, and Taste, in Great Britain;" prefixed to the succeeding volumes, to the year 1794 inclusive.

During the application of the dissenting ministers to parliament, for the enlargement of the Act of Toleration in the year 1772, to which he devoted much of his time and attention, he published a valuable pamphlet, vindicating that measure as to the matter, manner, and time of it. It was intended as an answer to a publication ascribed to a writer who afterwards filled a very high station in the church, and was

entitled "A Vindication of the Protestant Dissenting Ministers, with regard to their late Application to Parliament," 8vo.

Soon after his admission into the Royal Society, he published a pamphlet, entitled "Observations on the late Contents in the Royal Society," 1784, 8vo.; with a view of allaying the animosities that subsisted in that body, which produced a good effect. His intimate connection with Sir John Pringle, bart. who was formerly a very respectable and useful president of the Royal Society, led Dr. Kippis, after his decease, to republish his Six Discourses, delivered at the assignment of Sir Godfrey Copley's medal, to which he has prefixed a valuable life of the author, 1783, 8vo. At the close of the American war he published a political pamphlet, formed from materials which were communicated to him by persons of eminence, and designed to justify the peace, which terminated that unhappy contest. This pamphlet was entitled "Considerations on the Provisional Treaty with America, and the Preliminary Articles of Peace with France and Spain." He also published several single discourses, which were delivered on particular occasions; some of which are reprinted in his volume of sermons, 1794. Nor should we omit to mention his account of the life and voyages of captain Cook, 1788, 4to.; his new edition of Dr. Doddridge's Lectures, with a great number of additional references; his life of this excellent person, prefixed to a new edition of his Exposition of the New Testament, 1792; his life of Dr. Lardner (to whose abilities, character, and writings he has paid the just tribute of respect) prefixed to the complete collection of his works; in 11 vols. 8vo. 1788: and "An Address delivered at the Interment of Richard Price, D.D. F.R.S., &c. 1791;" and an "Ordination Charge," 1788, 8vo. He also assisted in selecting and preparing "A Collection of Hymns and Psalms, for public and private Worship," 1795, 8vo. and 12mo. which is used in many places of worship among Protestant dissenters, and has passed through several editions. But the work, to which Dr. Kippis devoted his principal attention for many of the last years of his life, and by which he has acquired singular reputation, was the Biographia Britannica. His indefatigable industry in collecting materials for it, his access to the best sources of information, his knowledge of men and books, his judgment in selecting and marking every circumstance that could serve to distinguish talents and character, and the habit which he had acquired by long practice of appreciating the value of different works, qualified him, in a very high degree, for conducting this elaborate performance. It has been much regretted, that he did not live to carry on this edition of the "Biographia," farther than to about a third part of the sixth volume, which has not yet made its appearance.

Notwithstanding the time that must have been devoted to the several objects now recited, and to the correction and publication of the works of friends, who respected his judgment and wished to avail themselves of his assistance, which he could never refuse to those who requested it; Dr. Kippis never neglected the studies and duties more immediately pertaining to his character as a divine, and his profession as a minister. His acquaintance with the various branches of theology, and with subjects subservient to his critical study of the scriptures, was very extensive. He was in the daily habit of reading some portion of the New Testament in the original language. He was conversant with the best writers on Jewish and Christian antiquities; and in the course of his reading no work escaped him, that was designed to illustrate the evidence, to establish the truth and

divine original, and to investigate the genuine doctrines of the Christian Revelation.

He was a believer in Christianity upon the maturest examination and the fullest conviction. No person was better acquainted with the controversies which Revelation has produced. He had studied them in his earlier and riper years with great attention; and though he was ready to allow the force of every difficulty and objection, yet to the ample preponderance of evidence his deliberate and impartial judgment submitted. Authority, indeed, is not absolutely conclusive in questions of this nature. Yet whilst Christians can rank in the number of the advocates of their religion such men as Bacon and Boyle, Newton and Locke, Clarke and Hoadeley, Jortin and Lardner, and many other living writers of the first eminence with respect both to learning and character, who have professedly studied the evidence of Revelation; there is no real ground of alarm from the feeble efforts of avowed infidels, who have acquired popularity in another way, and to whom a partial attention may be directed, but who manifest great ignorance of its subject, and who are very reprehensible on account of their mode of attacking Christianity.

The principles which Dr. Kippis derived from Christianity were the directory of his conduct and the source of his consolation. By the amiable sensibility of his heart, as well as by the sober conviction of his judgment, he was led to value the discoveries and hopes of the gospel; to submit to the practical influence of its doctrines and precepts; and to cherish the pleasing and animating expectations which it afforded. He had imbibed in a very high degree the mild and placable and benevolent spirit of the religion which he professed, and he exemplified this spirit both in his preaching and in his practice.

Of his sentiments as a divine, and of his abilities as a preacher, it is hardly necessary for us to say any thing on this occasion. Towards the close of his life the inclination of his mind was to the distinguishing opinion of the modern Unitarians; though he was far from embracing all the tenets that have been adopted by some persons who are thus denominated. However, he disapproved their appropriating this appellation to themselves, which he considered as assuming and exclusive; and he lamented that excess of zeal, with which speculations, comparatively of small importance, are maintained and propagated. Those doctrines and duties which he thought of principal moment, he sedulously inculcated. Tenets of inferior importance, and that had no immediate influence on rectitude of temper and practice, he more generally avoided. Such, indeed, were the meekness and moderation of his temper, his solicitude to preserve peace and unity, and his governing desire to guard against the pernicious effects of a controversial and contentious spirit, that he beheld with concern the intemperate eagerness and ardour with which disputes of trivial moment have been sometimes conducted, and he deprecated the unhappy divisions which they are likely to occasion.

As a preacher, Dr. Kippis was rational and scriptural; judicious and instructive; practical and interesting, especially towards the close of his discourses; and he blended the argumentative and pathetic on particular occasions. His compositions were always well studied; his voice was clear and harmonious; his delivery was natural and unaffected, and on occasions that required it, animated and impressive; and though he sought not that popularity which depends more on sound and gesture and mechanical exertions, than on rational and fervent addresses to the judgment and affections, and which is generally of no long duration, he re-

tained the respect and esteem of the society in Westminster for more than 42 years.

Such are the general outlines of the character and labours of Dr. Kippis. "The portrait, I am sensible," says the writer from whose account of him this article is extracted, "is not sufficiently just to the original. In delineating a character, which exhibits so many excellencies and so few defects, none can suspect me of approaching to adulation. My respect for him was great. I honoured him as a father. I loved him as a brother. But my affection, I am confident, has not misled my judgment. By the favour of Providence, which marks the bounds of our habitation, I was led in early life into an intimate connection with him. Our acquaintance, as co-tutors and co-adjustors in public business, ripened into an established friendship; and our friendship continued, without so much as a momentary interruption, and with increasing attachment, for more than 32 years, to the day of his death. It must have been my own fault, if I have not derived advantage from his extensive literary knowledge, from the wisdom of his counsel, and from the exemplariness of his conduct. No apology, I trust, will be thought necessary for introducing myself on this occasion. As it was my ambition to cultivate the friendship I enjoyed, it is my pride to have it publicly known, that I valued that friendship, as one of the chief honours and pleasures of my life. The friend I have lost cannot be easily replaced." See Rees's Funeral Sermon, preached at the Meeting-house, in Prince's-street, Westminster, Oct. 18, 1795.

KIPPURE, in *Geography*, the name of the highest mountains in the chain extending into the counties of Wicklow and Dublin, about ten miles south of the city of Dublin.

KIRA, a small island in the gulf of Engia; nine miles W. of Engia.

KIRAHIANA, a town of Hungary; 15 miles E.S.E. of Munkacz.

KIRALI, a town of Asiatic Turkey, in Caramania; 35 miles W.S.W. of Cogni.

KIRANOOR, a town of Hindoostan, in the Carnatic; 22 miles N. of Nattam.

KIRANORE, a town of Hindoostan, in Marawar; 20 miles S. of Tripatore.

KIRBYE, GEORGE, in *Biography*, an excellent English madrigalist on the Italian model; but who was more remarkable for simplicity than taste and fancy. In 1597, he published his first set of madrigals to 3, 4, 5, and 6 voices; several of which were successfully revived at the concert of ancient music and the Catch-club, during the first years of those institutions. They are now suffered again to sleep in peace, with those of Walker, Wilbye, Eli, and Bennet, our principal madrigalists, perhaps never to be waked again.

KIRCAGATCH, in *Geography*, a town of Asiatic Turkey, about 40 miles N.E. of Magnisi or Magnesia, on the route to Prusa, which has risen to considerable population, from the cultivation of cotton.

KIRCAJAN, a town of Persia, in the province of Kerman; 117 miles E. of Sirgjan.

KIRCALDY, a small town of Fife, on the N. coast of the Frith of Forth, about three miles east of Kinghorn, from which also there is a ferry to Leith and Edinburgh. Besides the ferry and the fishing, Kircaldy used to employ a considerable number of ships, brigs, and other vessels, in the trade with the eastern countries of Europe and the Baltic, but these were more frequently chartered or freighted from other ports than their own. It has also been long a consider-

able place for the manufacture of coarse goods both of linen and cotton, and this trade is still prosecuted to a very considerable extent. The chief article of their manufacture consists in low-priced blue and white checked goods, used for seamen's shirts, and for clothing for the negroes in the West Indies. So great has been the demand for these articles at particular times, that shortly after the capture of Trinidad by the British, the writer of this article was requested by an eminent West India house in Liverpool, to endeavour to procure for them seven thousand pieces of these checks, or any quantity which could be supplied. Upon application, however, he found the demand from other quarters so great, that only a very small proportion of the supply could be procured. Coarse low-priced checked handkerchiefs are also manufactured to a very considerable extent.

Kircaldy was erected into a royal burgh in the fifteenth century, and its charter was ratified by Charles I. in 1644, and is governed by a provost, bailiff, and council, at which time it is said that 100 sail of ships belonged to the port: the chief article of export is coals; and the importation consists of corn, flax, flax-seed, linen-yarn, wood, iron, ashes, tallow, bark, hides, &c. Kircaldy is united with Dyfart, Kinghorn, and Bursafland, in electing a member to serve in parliament. In 1801, the number of inhabitants was 3248, of whom 700 were employed in trade and manufactures; 13 miles north of Edinburgh. N. lat. 56° 7'. W. long. 3° 9'.

KIRCH, GODFREY, in *Biography*, an able astronomer, was born at Guben, a town in Lower Lusatia, in the year 1640. He prosecuted his studies at Leipzig, where he acquired considerable reputation by the almanacs which he published. In 1692, he married Mary Margaret Winckelman, who rendered him much useful assistance by making astronomical observations for the construction of his Ephemerides. In 1701, on the establishment of the Academy of Sciences at Berlin, by Frederic I., king of Prussia, that prince invited M. Kirch to be a member of the society, and to take upon himself the office of astronomer in ordinary, with an honourable pension for his support. He died at Berlin in 1710, at the age of seventy-one years. He had been in the habit of corresponding with all the learned societies of Europe, and published a variety of astronomical treatises, which are in considerable estimation.

KIRCH, MARY-MARGARET, wife of the preceding, was daughter of a Lutheran clergyman at Panitzsch, a village near Leipzig, where she was born in the year 1670. Having lost her father when she was only twelve years of age, she was educated by his successor, and indulged the inclination which she discovered for the acquisition of knowledge, and particularly that of astronomy. This partiality for his favourite pursuit was a recommendation to M. Kirch, who obtained her hand in marriage, and found her a most valuable assistant in his scientific labours. She was not contented, however, with rendering her husband important services, but shewed herself capable of viewing the heavens with the eye of a discoverer, and in 1702, the first saw a comet, upon which M. Kirch published his observations. In 1707, she discovered a peculiar Aurora Borealis, of which mention is made in the Memoirs of the Academy of Sciences at Paris, for the year 1716. These exertions of her genius procured her the esteem of the learned at Berlin, notwithstanding which she was in very low circumstances when her husband died. She contrived to maintain herself and educate her children, by constructing almanacs, and, in 1711, she published a dissertation, intitled "Preparations for observing the grand Conjunctions of Saturn, Jupiter, &c."

Soon after this she found a patron in the baron de Throfsick, who furnished her with apartments in his own house, adapted to the carrying on her astronomical observations. Here she lived till the baron's death, which happened about two years afterwards. She now removed to Dantzic, when Peter the Great wished to engage her to settle in his empire. She preferred her native country, and, in 1716, accompanied her son to Berlin, where she was appointed astronomer to the Academy of Sciences in that city. She was now introduced to the notice of the royal family, and secured the patronage of some of the branches of it. She died in 1720, in her fifty-first year.

KIRCH, CHRISTIAN FREDERIC, son of the preceding, was born at Guben, in the year 1694, and discovered an early and very strong bias for scientific pursuits. He commenced his studies at Berlin, and afterwards continued them at Halle, whence he made excursions, for improvement, to Nuremberg, Leipzig, and Prussia. He was employed a considerable time in the observatory at Dantzic, and during his residence there the czar, Peter the Great, offered him an establishment at Moscow; but his attachment to his mother, who was averse from leaving Germany, led him to decline it. In 1717, he was made member of the Academy of Sciences at Berlin, and, in 1723, he was chosen a corresponding member of the Royal Academy of Sciences at Paris, and he shewed himself worthy of that distinction, by the frequent valuable contributions which he transmitted to them during the remainder of his life. He died in 1740, in the forty-sixth year of his age. He published several works connected with astronomy, which were in considerable reputation at the period in which he flourished. Moreri.

KIRCHBACH, in *Geography*, a town of the duchy of Stiria; 14 miles S.E. of Gratz.

KIRCHBERG, a town and castle of Bavaria; 12 miles N of Landthut.—Also, a town of Germany, in the principality of Hohenlohe, on the Jaxt; 28 miles W. of Anspach.—Also, a town of Saxony, in the circle of Erzgebirg; six miles S. of Zwickau.—Also, a town of the principality of Nassau-Dietz, capital of a bailiwick; five miles S.E. of Dietz.—Also, a town of Austria; 11 miles S. of St. Polten.—Also, a town of France, in the department of the Rhine and Moselle, and chief place of a canton, in the district of Simmern. The place contains 772, and the canton 6491 inhabitants, in 35 communes.

KIRCHEAN MUSEUM at Rome, was founded by father Kircher about the middle of the seventeenth century. This celebrated museum is full of ancient paintings, vases, gems, intaglios, cameos, and other antiquities, which are there in such abundance, that a spectator might fancy himself at Portici; but the curiosities which we were most eager to see and examine, were father Kircher's musical instruments and machines described in his *Musurgia*. They were almost all out of order in 1770, and in decay; and it is to be feared that time has not improved them. Their construction was not only curious, but manifested the ingenuity as well as zeal of the learned father, in his musical enquiries and experiments.

KIRCHEIM-BOILANDEX, in *Geography*, a town of France, in the department of Mont Tonnerre, and chief place of a canton, in the district of Mayence; 28 miles N.W. of Manheim. The place contains 1872, and the canton 9265 inhabitants, in 22 communes. N. lat. 49° 39'. E. long. 7° 50'.

KIRCHER, ATHANASUS, in *Biography*, a celebrated mathematician and philosopher, was born at Fulda in the year 1601, and when he was seventeen years of age he commenced his noviciate in the society of the Jesuits, among whom

whom he distinguished himself by his vast proficiency in literature and science. Having finished his studies, he was selected by his superiors to fill the chair of professor, and taught philosophy, mathematics, the Hebrew and Syriac languages, in the university of Wirtzburg, in Franconia, with great success till the year 1631. During the war between the emperor Ferdinand II. and Gustavus, king of Sweden, he withdrew to France, and resided some time in the Jesuits' college at Avignon. After this he was called to Rome, where, for six years, he filled the post of mathematical professor in the Roman college, and then undertook the professorship of Hebrew. He died in the year 1680, in the eightieth year of his age. His works amount to twenty-two volumes folio, eleven in quarto, and three in octavo. Of these the following are mentioned as the principal, "Prælectiones magneticae;" "Primitivæ gnomonicae catoptricae;" "Ars magna lucis et umbræ;" "Mufurgia univerfalis;" "Obeliscus Pamphilus;" "Œdipus Ægyptiacus;" "Itinerarium extaticum;" "Obeliscus Ægyptianus;" "Mundus subterraneus;" "China illustrata." Kircher was a man of very extensive erudition, and of indefatigable industry, but the subjects of his studious labours were more frequently curious than useful, and a visionary fancy, rather than a cool judgment and accurate enquiry, too frequently guided his pen. Whatever wore the stamp of antiquity fascinated his attention, and he had a particular passion for decyphering hieroglyphical characters, of which, if he could not discover the true meaning, he was always ready to give what he conceived to be a plausible one. He had collected a rich cabinet of antiquities, curiosities, medals, mathematical instruments, rare animals, minerals, &c. for the museum of the Roman college, the arrangement of which was begun by himself, and finished by father Bonanni, who published a description of it at Rome in 1709, intitled "Musæum Kircherianum, &c." Moreri.

The chief work of Kircher, which we shall notice here, is his "Mufurgia Univerfalis," dedicated to Leopold, archduke of Austria, afterwards emperor of Germany, who was not only a patron of music, but an excellent performer on the harpsichord. The Mufurgia is written in Latin, in ten books, occupying two volumes in folio, of which the first contains seven books, and the second three.

The subjects which he treats are, chiefly, the following:—of the propagation of sound;—of the elements of practical music;—of harmonics, or the ratio of sounds;—geometric and algebraic division of the monochord;—new experiments on the construction of musical instruments;—of melody, comprehending new secrets for producing every species of cantilena;—a parallel between the ancient and modern music, pointing out the dignity of the ecclesiastical canto fermo, and the means of arriving at the pathetic style;—of composition, or the combination of sound, and application of melody to poetical numbers and rhythms in all languages;—musical wonders produced by latent means and new experiments of various kinds;—and lastly, of the various derivations of music and the physical and artificial purposes to which it is, or may be, applied.

This work, which undoubtedly contains many curious and amusing sections, is, however, disgraced by the author's credulity and ill-founded assertions.

Father Kircher has been very truly called "Vir immense quidem, sed indigestæ eruditionis," a man of immense, but indigested learning.

He was always careless of what he asserted, credulous, and inaccurate; collecting, without choice or discernment, whatever he found relative to the subject upon which he was

writing; and adopting whatever was offered to him, true or false, provided it contained any thing marvellous.

His Mufurgia, published at Rome in 1650, is a large book; but a much larger might be composed in pointing out its errors and absurdities. Yet with all its imperfections, it contains much curious and useful information, for such as know how to sift truth from falsehood, and usefulness from futility; for a considerable portion of which, however, he was obliged to Père Merienne, whose "Harmonie Universelle" appeared in 1536.

KIRCHER, CONRAD, a German Protestant divine, who was settled at Augsburg, and was author of a very learned and laborious work, of considerable use in illustrating the genuine sense of the holy scriptures. This work was intitled "Concordantia veteris Testamenti Græcæ, Ebræis vocibus respondentes πολυγλωσσοι. Simul enim et Lexicon Ebraicolum, &c." printed at Franckfort, 1607, in two volumes, quarto. This work, which is a Hebrew Dictionary and Concordance, is strongly recommended by father Simon when treating of the best methods to be adopted in undertaking any new translation of the scriptures. It contains all the Hebrew words in the Old Testament, introduced in an alphabetical order, and underneath is the Greek version of them from the Septuagint, followed by a collection of the passages of scripture in which those words are differently interpreted. Moreri.

KIRCHHAMM, in *Geography*, a town of Carinthia, on the borders of the Tyrol; 16 miles N.N.W. of Greiffenberg.

KIRCHHAYN, a town of Hesse Cassel, on the Wohra, containing more than 400 houses; 35 miles S.S.W. of Cassel.—Also, a town of Lusatia, on the Little Elster; 14 miles S. of Luckau. N. lat. 51° 36'. E. long. 13° 35'.

KIRCHHEIM, a town of Wurtemberg, on the Lauter; 24 miles N.W. of Ulm.—Also, a town of Germany, the capital of a lordship belonging to the family of Fugger; 25 miles E.S.E. of Ulm.

KIRCHLAUTERN, a town of the duchy of Wurzburg; 8 miles N.W. of Bamberg.

KIRCHPACH, a town of Austria; 10 miles W.N.W. of Horn.

KIRCHPERG, a town of Bavaria; 13 miles N.W. of Moßburg.—Also, a town of Austria; 8 miles S.W. of Sonneberg.

KIRCHSCHLAGEN, a town of Austria, with a medicinal bath; 10 miles S. of Zwettl.

KIRCHWALSEDE, a town of Germany, in the county of Verden; 11 miles N.E. of Verden.

KIRCKMAN, JACOB, in *Biography*, an excellent harpsichord-maker from Germany, who came to England about the year 1740, and worked with the celebrated Tabel, as his foreman and finisher, till the time of his death. Soon after which, by a curious kind of courtship, Kirckman married his master's widow, by which prudent measure he became possessed of all Tabel's seasoned wood, tools, and stock in trade. Kirckman himself used to relate the singular manner in which he gained the widow, which was not by a regular siege, but by storm. He told her one fine morning, at breakfast, that he was determined to be married that day before twelve o'clock. Mrs. Tabel, in great surprize, asked him to whom he was going to be married, and why so soon? The finisher told her, that he had not yet determined whom he should marry, and that, if she would have him, he would give her the preference. The lady wondered at his precipitancy, hesitated full half an hour; but he continuing to swear that the business must be done before twelve o'clock that day, at length she succumbed;

dered; and as this abridged courtship preceded the marriage act, and the nuptials could be performed at the Fleet or May Fair, "without loss of time, or hindrance of business," the canonical hour was saved, and two fond hearts were in one united, in the most summary way possible, just one month after the decease of Tabel.

Kirkman lived long enough to flock the whole kingdom with his instruments, and to amass great wealth. He had no children, but as many nephews hovering over him as a Roman pontiff.

Theodorus, the father of Ilocrates, was a flute-maker, who acquired wealth sufficient by his employment not only to educate his children in a liberal manner, but also to bear one of the heaviest public burthens to which an Athenian citizen was liable; that of furnishing a choir or chorus for his tribe, or ward, at festivals and religious ceremonies.

Each tribe furnished their distinct chorus; which consisted of a band of vocal and instrumental performers and dancers, who were to be hired, maintained, and dressed, during the whole time of the festival; an expence considerable in itself, but much increased by emulation among the richer citizens, and the disgrace consequent to an inferior exhibition. The fluctuations of trade and public favour have rendered the business of boring flutes far less profitable at present, than it was in the time of Theodorus. But our harpsichord maker, Kirkman, who was known to be worth 90,000*l.* twenty years before he died, doubled the profits of his instruments, by becoming a pawnbroker and a usurer; obliging young heirs with money as kindly, and with as much liberality, as a Hebrew.

At a time when ruin stared harpsichord-makers in the face, by the rage with which musical ladies were seized for the guair, in preference to all other instruments, Kirkman hit on an ingenious expedient which saved himself from bankruptcy, and restored the harpsichord to all its former favour. (See GUITAR.) He did not live to see his excellent double harpsichords of sixty or seventy guineas price, sold at auctions for twelve or fourteen pounds, and the original purchasers turn them out of their houses as useless lumber. But such are the vicissitudes of this world, that our descendants will, perhaps, know as little about the pianoforte, as we do now of the late or lyre. Kirkman is supposed to have died, in 1778, worth near 200,000*l.*

KIRCUBBIN, in *Geography*, a post-town of Ireland, in the county of Down and province of Ulster, situated in the peninsula of Ardes, and 97 miles N. by E. from Dublin.

KIRCUDBRIGHT. See KIRCUDBRIONT.

KIRDORF, a town of Upper Hesse; 34 miles W. of Cassel.

KIRENSK, a town of Russia, in the government of Irkutsk, on the Lena. N. lat. 57 40'. E. long 108 14'.

KIRENSKOL, a town of Russia, in the government of Irkutsk, on the borders, built in the year 1655, on a fertile soil, but now decaying; 112 miles W. of Doroninsk.

KIRGANELIA, in *Botany*, from *Kirgani*, a name in the Hortus Malabaricus for several species of *Phyllanthus*. Juss. 387. This genus is founded by Jusseu on a shrub called in the island of Mauritius *Bois de demoiselle*, and which Commerçon, in conformity perhaps to that appellation, destined to commemorate a botanical Neapolitan lady, Maria Angela Ardinghelli, who translated the works of Dr. Hales into Italian. Our specimen from Commerçon is marked *Ardinghella*, and we cannot account for Jusseu's passing this name over in silence. How far the genus is distinct from *Phyllanthus*, or from *Cicca*, with which latter its pulpy fruit nearly accords, we are not furnished with materials sufficient to decide.

KIRGHISES, KIRGEISES, or *Kirgises*, in *Geography*, a tribe of Tartars, who occupy about one-half of Independent Tartary, in the north. They are also called "Kaizaks," and are of undoubted Tartaric origin, so that they seem to live in perfect amity with their southern brethren, the Uzbeks. These Kirgises are divided from Siberia by the great Stepp, or desert of Ilim, which is interlined by a river of the same name. On the west of the Kirgises there still remain some tribes of Kalmuks, though the most of them migrated from the Volga in 1770, when they sought the protection of the Chinese. The Kirgises are supposed to derive their name from the founder of their horde; and from time immemorial have been classed under three divisions, of great, middle, and lesser, though quite unknown to Europe till the Russian conquest of Siberia, at which time they nominalized at the superior Yenissey about the Yufs, the Abakhan, &c.; and in the year 1606, some tribes of them became subject to the Russian empire, at the same time with the Barabines. From that period, by their puffedness, their faithlessness, their frequent rebellion, and the subjugation of correlative nations, they have had the character of an extremely turbulent people. The revolutions which have thus been produced in their political condition, induced them to remove from the Yenissey to the Oby, and gradually farther to the west and the south. They at present inhabit the prodigious desert between the Ural and the Irtysh, denominated by the Russians the Kirghisian Steppe, and bordering westward on the Caspian and the government of Caucasus, northwards upon the parts about the Ufa and the Tobol, and eastwards on the government of Kolhyvan. The great horde, defended by mountains on the south and east, asserted their independence in repeated contests with the Kalmuks of Soongaria. The middle and little hordes have acknowledged the Russian sovereignty ever since the year 1731; but having always been unfaithful allies, and a very piratical people, the Russians have been obliged to construct lines of small forts along the frontier rivers. Each of these two hordes is estimated at 30,000 kibitkies, or families, and supposing the great horde to contain 60,000, and each family to consist of six persons, the population of this wide region may amount to 720,000; but it probably does not exceed half a million. Their manners have been minutely described by Pallas. Their tents are constructed of a kind of felt; their drink is kumis, made of acidulated mare's milk. The great horde is considered as the source of the two others. Being settled near the mountains of Alak, called also Ala Tau, this horde has been denominated the Alatanian Kirgises. They lead a wandering life from the borders of the Upper Sirr, or Syrt, near Tashkunt, to the Steppe of Ilim. Each horde has its peculiar khan; but the middle horde, when Pallas approached this country, was contented with a prince, that acknowledged the khan of the lesser horde; and in 1777, this khan of the lesser horde, whose election had been confirmed by Russia, was called Nur Hali, a sensible and equitable prince. The features of the Kirgises are Tartaric, with the flat nose and small eyes; but not oblique like those of the Monguls and Chinese. They have horses, camels, cattle, sheep, and goats. Some individuals in the middle horde are said to have 10,000 horses, 300 camels, 3 or 4000 cattle, 20,000 sheep, and more than 2000 goats; while some in the lesser horde were proprietors of 3000 horses, and a proportionable number of the other animals. Their dromedaries furnished a considerable quantity of woolly hair, which was sold to the Russians and Bucharians, being annually clipped like that of sheep. Their chief food is mutton, of the large-tailed sort; and so exquisite is the

lamb, that it is sent from Orenburg to Petersburg for the tables of the palace. The lamb-skins are the most celebrated after those of Bucharia, being damasked as it were by clothing the little animal in coarse linen. But the wool of the sheep being coarse, is used only in domestic consumption for felts and thick cloths. The fleppes supply them with objects of the chace, wolves, foxes, badgers, antelopes, ermines, weazels, marmots, &c. In the southern and eastern mountains are found wild sheep, "ovis musimon," the ox of Tibet, "bos grunniens," which seems to delight in snowy alps; with chanoys, chacalls, tigers, and wild asses.

"As the Kirgufians regard one another as brethren, they are obliged to employ slaves, being captives whom they take in their incursions. Their dress is the common Tartaric, with large trowsers and pointed boots. A thin veil supplies the place of a shirt, and they commonly wear two short robes. The head is shaved, and covered with a conic bonnet. Their clothes are numerous and light, so that if they fall from horseback, they are seldom hurt; their saddle-horses are richly ornamented; but their riders are short in stature, and their trowsers ascend to the arm-pits, so that they resemble a pair of pantaloons on horseback. The ladies ornament their heads with the necks of herons, disposed like horns. They appear to be Mahometans, though rather of a relaxed creed.

"The Kirgufians carry on some trade with Russia. The chief traffic, which is wholly by exchange, is at Orenburg, but the middle horde proceed to Omik. Sheep, to the amount of 150,000, are annually brought to Orenburg; with horses, cattle, lambs, skins, camels'-wool, and camels; sometimes they offer slaves, Persians or Turcomans. In return they take manufactured articles, chiefly clothes and furniture. From Bucharia, Kliiva, and Tashkund, they receive arms and coats of mail, which Russia refuses, in return for camels and cattle. They are extremely fond of the Kalmuk women, who long retain their form and charms; and often marry them, if they will adopt the Mahometan religion. There is an annual festival in honour of the dead. About the beginning of the 17th century this people, who were formerly Shamanians, became children of circumcision, by the exertions of the priests of Turkistan; but Pallas, in 1769, found them addicted to forceries and other idle superstitions."

This barren country, now inhabited by the Kirgufes, has been the scene of considerable events; and it is not improbable, that its numerous deserts and plains have been formerly more fertile, at least in pasturage. However this be, these regions have been held by successive nations of high repute, from the Massagetae of early times to the Turks. Pallas, cited by Pinkerton in his Geog. vol. ii. Tooke's View of the Russian Empire, vol. i.

KIRIAN, a mountain of Tibet. N. lat. 33° 12'. E. long. 79° 44'.

KIRIANI, a town of European Turkey, in Livadia; 8 miles S.E. of Athens.

KIRILOV, a town of Russia, in the government of Nvorgorod; 52 miles N.W. of Vologda.

KIRIN, or KIREN-OLA, one of the three grand departments of the country of the Mantchew or Mandhur Tartars, or Eastern Chinese Tartary, bounded on the N. by the river Saghalien, on the E. by the sea, on the S. by Corea, and on the W. by the province of Leao-tong. This country, which is rendered extremely cold by the number of forests that cover it, is scarcely inhabited; it contains only two or three ill-built cities, surrounded by plain mud-walls. The valuable plant "ginseng" grows here; and the em-

peror sends hither those criminals, who are condemned to banishment by the laws. The capital is also called Kirin, or Kerin, and is situated on the river So-gari, called at this place Kirin, which falls into the Saghalien or Amur, and was the residence of the Mantchew or Mandhur general, who was invested with all the powers of a viceroy; inspecting the troops and having authority over all the Mandarins; 500 miles N.E. of Peking. N. lat. 43° 48'. E. long. 126° 24'.

KIRKBY-LONSDALE, a market town and parish in the valley of Lonsdale, whence its second, or distinctive name, on the bank of the river Lune, at the northern edge of the county. It is 12 miles south-east of Kendal, and 252 north of London. In the year 1800, the town contained 260 houses, and 1283 inhabitants. At this place Kirkby, bishop of Carlisle, repulsed the Scots. He was a native of this town. Over the Lune is a curious bridge of three arches, and in the market place is a cross of rather singular character. The church is a large building, 120 feet in length, by 102 in breadth. In the church library is the following inscription: "This library, pulpit, and new loft, together with the school-house, were founded by Mr. Henry Wilton, of Underly, who gave to the colleges 100*l.* besides 35*l.* yearly to seven poor scholars going to Queen's-college in Oxford; and to this church and school 240*l.*; to the poor of Kirkby-Lonsdale lordship 500*l.*; besides many other gifts to pious uses in other places: by all which, he, being dead, yet speaks." About two miles from the town, towards Lonsdale, is Borrow-hall, the seat of Thomas Fenwicke, esq. It is seated in a narrow dale, and nearly surrounded by mountains. At Kirkby a weekly market and three fairs, annually. Nicholson and Burn's History, &c. of Westmoreland, 2 vols. 4to. 1777.

KIRKBY-Moorfield, a market town and parish in that part of Yorkshire called the North-Riding, England, as its name implies, is seated among the moors, or mountains, which abound in that part of the island. This town is 28 miles N. of York, and 233 from London. In the year 1800, it contained 287 houses, and 1396 inhabitants. By the statement in Domesday-book the manor of this place, then called Chirchabi, was one of the heads of the ancient family of Stutevilles, one of whom founded an abbey at Keldholone, about one mile from this town. On the top of a hill, to the north-east of Kirkby, is the site of an ancient building, said to have been the seat of the abovenamed family, who continued to reside here till the reign of Henry III. The Nevilles, lords, Latimer, had also a manor-house here. George Villiers, the dissolute duke of Buckingham, part of whose estates lay here, and at Helmfle, where he had a seat, died in a miserable condition, in a mean house in this town. Pope, in his Moral Essays, has characterized the place, and severely reprobated the man in lines of peculiar force and severity.

"In the worst inn's worst room, with mat half-bung,  
The floors of plaster, and the walls of dung,  
On once a flock-bed, but repaired with straw,  
With tape-tied curtains, never meant to draw,  
The Gorge and garter dangling from that bed,  
Where tawdry yellow strove with dirty red,  
Great Villiers dies."

About one mile west of the town is Kirkdale church, an ancient edifice, seated in a most romantic situation, and noted for an inscription over the south door. An account of this was written by Mr. Brooke, for the Society of Antiquaries, who published the same with a print in vol. v. *Archæologia*.

**KIRKBY-Stephen**, a market town and parish in the county of Westmoreland, England, is seated on the western bank of the river Eden, in a mountainous part of the country. The town consists of one street, running north and south, at the extremities of which are prospects of the Helbec and Wildbore mountains. Formerly there was a spacious area for a market place, which has been nearly covered with buildings. A market is held here every Monday, and is chiefly occupied by the manufacturers and dealers in stockings. This town is four miles from Brough, and 266 north of London. The parish church is a large building, and contains some old monuments. Adjoining it is a handsome parsonage-house, built by the late Dr. Chaters, prebend of Durham, to whose family the living belongs. In the town is a free grammar-school, which has two exhibitions.

Near Kirkby are the ruins of Pendragon-castle, which was formerly the seat of the lords Clifford; and about one mile south of the town are Wharton-parks, the ancient seat of the Wharton family. This place is deserted, and the house fallen to decay. Nicholson and Burn's History, &c. of Westmoreland, 2 vols. 4to. 1777.

**KIRKCALDY.** See **KIRCALDY.**

**KIRK-CLISSA**, or **KIRKLEBAN**, a town of European Turkey, in the province of Romania; formerly called "Tessaraconta Ecclesie," or forty churches; at present it has neither walls nor churches, and but few Christian inhabitants. It is inhabited by many Jews, who are chiefly employed in making butter and cheese, for which they have a ready market among their friends at Constantinople; 30 miles E. of Adrianople.

**KIRKCUDBRIGHT**, the chief town of one of the stewartries into which the county or shire of Galloway in Scotland is divided. Kirkcudbright is situated on the Solway Frith, near the mouth of the river Dee, and, excepting as a market town for the adjacent district, is not eminent for any species of commerce, manufacture, or trade. The harbour is safe, with good anchorage, and sheltered from all winds; but being a tide-harbour is well fit for vessels that can take the ground. It was anciently a burgh of regality, and held of the Douglases, lords of Galloway, as superiors. On the forfeiture of the earl of Douglas, last lord of Galloway, in 1455, it was by James II. erected into a royal burgh, and is now governed by a provost, three bailiffs, and town-council. In the environs are many traces of ancient camps, British and Roman. Its castle, the mounds and dikes of which are still remaining, was evidently constructed to defend the entrance of the river Dee. In 1801, the number of inhabitants was 2380; 28 miles S.W. of Dumfries. N. lat. 54° 55'. W. long. 4° 5'.

**KIRKCUDBRIGHTSHIRE**, a division or county of Scotland, called the *Stewartry of Kirkcudbright*, forms the eastern, and by far the most extensive portion of Galloway. The latter name was anciently applied to an independent principality, which included the greater part of Ayrshire and Dumfriesshire, but is now limited to the two counties of Wigton and Kirkcudbright. The stewartry is situated between 54° 40' and 55° 20' of N. latitude, and contains 882,57 square miles, on 449,313 Scotch acres. It is bounded on the south by the Solway frith, which divides it from England; by Dumfriesshire and the estuary of the Nith on the east, by the same county and Ayrshire on the north, and by the latter, with the shire of Wigton and the bay of that name, on the west. Kirkcudbright has no subdivisions, except that four of the most northerly parishes, Cavefain, Dalry, Kells, and Balmaclellan, are commonly called the district of Glenkens. The aspect of the country,

Vol. XX.

however, affords a very natural division into two parts. If a line be drawn from the centre of Irongray parish to the Gatehouse of Fleet, all to the west and north, with little exception, is so mountainous, that it may be very properly termed a Highland district; while the south and east exhibit a fine champaign and cultivated country. The parishes are 28 in number, the whole population of which, according to the parliamentary returns of 1800, amounted to 29,211 persons. Kirkcudbright, Gatehouse of Fleet, Creetown, Castle Douglas, and New Galloway, are the principal towns. Besides these there are several considerable villages, which it will not be necessary to particularize in this place. Kirkcudbright is the county town, and a royal borough, as is also New Galloway. Creetown, which is situated at the upper part of Wigton bay, has lately been constituted a borough of barony: so likewise has Castle Douglas, a thriving village, not much above thirty years old, but which now contains nearly a thousand inhabitants. Some attempts have been made to introduce the cotton manufactures here; but the high price of coals opposes an almost unsurmountable impediment to ultimate success. The same circumstance operates, in no inconsiderable degree, against the establishment of manufactures, requiring large quantities of fuel, in every part of the stewartry. Those villages which are situated on the coast, however, being supplied with coal from England, have made more rapid progress, even in the manufacture of cotton, than could reasonably have been expected.

Though, as mentioned above, the greater part of this stewartry is hilly; yet, upon the whole, it contains few mountains remarkable for their size or height. The most lofty of those in the western division is that called Cairn-muir, within the parish of Minigaff, which rises 1737 feet above the level of the sea, and is surrounded by several others of equal altitude, though less striking to the eye, from the greater elevation of the circumjacent grounds. The hill called Cairnbarrow, in the parishes of Ayrworth and Kirkmabreck, is 1100 feet in height, very little encumbered with rocks, and commanding a very beautiful and extensive view, not only of the stewartry of Kirkcudbright and the shire of Wigton, but also of the Isle of Man, and the opposite coasts of England and Ireland. Crowfell, which terminates a lofty ridge of hills in the south-eastern part of the county, was formerly one of the alarm-posts for giving notice of the incursions of the English. The elevation of Douglas-Cairn, on the summit of this mountain, is said to be about 1903 feet, and Knockedoch, which surmounts the north wing, 1500 feet above the level of the sea. From this range of hills, the country descends towards the shore in the most regular and beautiful manner, exhibiting a delightful view of well-enclosed fields in a state of excellent cultivation. Immediately upon the sea, the scene is of a very different description: the coast here being remarkably bold and rocky, discloses from the sand, at low water, some grand and picturesque appearances; tremendous and rugged precipices; high and pointed spires, under the bases of which are passages resembling the form of rude arches; large and regular amphitheatres, leading into caverns, the extent of which no human being has yet ventured to explore.

At this point, and indeed on almost every part of the coast of this county, a great variety of marine plants are found. Among these the most remarkable are *samphire*, used for preserves or pickles; and the water *polyopus*, or *sea anemone*, which naturalists consider as the connecting link between the animal and vegetable kingdoms: for, though destitute of the faculty of locomotion, it possesses a degree

## KIRKCUDBRIGHTSHIRE.

of irritability and sensation much superior to any other known vegetable production. For a particular account of this very curious subject, see the article ANEMONE.

The stewardry of Kirkcudbright gives rise to several rivers, besides a number of smaller streams. The most remarkable of these are, the Orr or Urr, the Ken, the Dee, the Fleet, and the Cree. The Urr, which is also called the Uurr or Whurr, flows from a lake of the same name, in the parish of Balmacellan, situated in the district of Glenkens. Hence it runs almost directly south, and falls into the Solway frith near the village of Colvend. This river is navigable for vessels of 80 tons burden, to the distance of eight miles from its mouth. By means of it, therefore, coals, lime, and other articles, imported from England, are conveyed thus far up the county, and hence distributed to the more interior parts. The dangers and difficulties, however, attending this trade, owing to the numerous sand-banks in the channel of the Solway, which are every day becoming more extensive, oppose powerful obstacles to its increase, either here or at any other port on this coast. One advantage possessed by this river, is a large basin called Gibbs-hold, which it forms within land, about two miles from its confluence with the sea, where large vessels often secure a safe retreat during stormy weather. The Ken, the second river above mentioned, takes its rise also in the northern part of the stewardry, near the borders of Nithsdale. Flowing hence, at first in a south-westerly direction, it separates the parishes of Dalry and Cavephairn; then proceeding towards the south, with an inclination eastwards, it falls into Kenmuir-loch, and forms a junction with the Dee. This river begins its course among the hills in the north-western division of the county. After receiving the Ken, it flows towards the Solway frith, into which it discharges itself, after passing the town of Kirkcudbright. The Dee is remarkable both on account of its breadth and depth, particularly at the place called Kenmuir-loch. It is navigable to the village of Tongland, two miles above the town of Kirkcudbright; and, were it not for the number of rocks and shallows with which it abounds beyond this point, might be made the means of introducing an inland navigation to the very centre of the county. A survey was made some years ago, with a view to supply the defects of the river by a navigable canal, but the plan was not successful in meeting the approbation of parliament. A small canal, however, has been cut by the steward of the county between the Dee and a lake called Carlinwark-loch, which is situated above the shallows of Tongland, and furnishes marle in great abundance. The Fleet and the Cree are also navigable for several miles. The former rises out of a lake called Lochfleet, and pours its waters into the bay of Wigton, at a short distance from the village called Gatchoufe-of-Fleet. The Cree takes its rise among the mountains which separate the northern part of the county from Ayrshire, forming, for several miles of its course, the boundary of the stewardry. It serves as a continuation of the navigation of Wigton bay, and produces fish of various kinds, particularly salmon, in great plenty.

Few counties can boast of a greater number of lakes or lochs than Kirkcudbright. With the exception, however, of Lochken, or Kenmuir-loch, already mentioned as formed by the waters of the Ken and Dee, which is ten miles in length, they are, generally speaking, of small extent. The parish of New Abbey, in the eastern district of the stewardry, contains three lakes, Lochkendan, Lochend, and Craigend, the two last of which are nearly a mile long, and more than one half of a mile broad. Lochrutton, which gives name

to a parish, is of similar dimensions. In the centre of it is an artificial island, nearly of a circular form, and somewhat more than half a rood in circumference. It is composed, on the surface, of a vast collection of large stones. In Balmacellan parish there are five lakes. One of these, though very small, is famous for a particular species of trout, many of which weigh ten English pounds each. Carlingwark-loch, in the parish of Kelton, formerly covered 116 acres, but since the canal joined it to the Dee, it has been reduced to less than 80. This loch contains an inexhaustible fund of the very best shell marle. Before its extent was contracted, there were two isles in it, upon which the country people say two churches or chapels formerly stood. Indeed, the tradition in the neighbourhood is, that there had been a town in the loch, which was drowned or swallowed up. The discovery of an iron forge, on the south isle, some years ago, seems to give some probability to this idea. It was surrounded by the remains of a stone building or rampart, and communicated with the opposite side of the lake by a causeway or road of stones, secured by piles of oak wood, and having an opening in it, supposed to have been for a drawbridge. Several canoes, hollowed by fire, after the manner of the American savages, and a large iron mallet, have also been found in this loch. Besides those already noticed, there are a number of smaller lakes in different parts of the county. None of them, however, deserve to be particularized except Loch Kohn or Koan, which is situated in the parish of Crossmichael. It extends over 40 acres of ground, and is from 10 to 22 fathoms deep. No rivulets or streams flow into it, nor indeed has it any visible source of supply excepting the clouds. It never freezes but during the most intense froit.

This county contains a variety of minerals and mineral springs. The want of coals, however, and the difficulty of shipping them, in general prevents the former from being turned to advantage. A rich iron-mine, in the parish of Kerriek, was wrought for some time by an English company, but they were at last obliged to abandon it. A lead mine, however, has been opened, and is still successfully carried on in the western division of the stewardry. Both these metals are found in abundance in many other parts. Appearances of copper have also been observed; but it is not known that any trial of it has been made. There is also great plenty of limestone, though of an inferior quality, as yet untouched; and a vast fund of excellent shell-marle for manure, which is too much neglected by the farmers, and lime exported in its stead, at a very considerable expence.

The remains of antiquity in this county are still very numerous, and many of them in no small degree interesting. The abbey of Sweetheart, or New Abbey, in a parish of that name, is a beautiful lofty building in the light pointed style. It was founded in the 13th century by Devongilla, the mother of John Baliol, king of Scotland. This structure stands in a fine level field about 20 acres in extent, which is enclosed by a stone wall ten feet high, built of granite stones, some of which are of immense size.

Hil's castle situated near Lochrutton, and about three miles from Dumfriess, was one of the many fortified places which belonged to the Douglas family, as lords of Galloway. Edward the first lodged here, on his way to Kirkcudbright in the year 1300. A tower and a few small buildings, which surround a square court, are all that remain of this edifice. Buittle castle, the favourite residence of king John Baliol, is still to be seen in the parish whence it derives its name. The hand of time, however, has nearly levelled it with the ground. An old coin was discovered  
here

here some years ago, bearing the date 1220. This neighbourhood is remarkable for a number of wittified forts, the nature and formation of which antiquaries have found it difficult to determine; and respecting which various opinions are entertained.

One of these forts appears also on the top of a small hill in the parish of Anworth. The summit forms an area of thirty paces long and twenty broad, and is nearly surrounded by an irregular ridge of loose stones, intermixed with large portions of vitrified matter. These stones are of the common blue schist kind, and from the manner in which they lie scattered about, it would seem that the fort has either been deficient in regularity of structure originally, or been intentionally demolished. Some coins of Edward VI. and queen Elizabeth were lately found near this spot. Thrieff castle, which is situated in an island formed by the river Dee, is famous for having been the chief residence of the Douglasses. A great square tower is all that remains of the once proud and lofty mansion of these celebrated warriors.

Lincluden college was founded in the reign of Malcolm IV. It was originally a Benedictine nunnery, but afterwards converted into a monastery, in the chapel of which is an elegant monument, erected in honour of Margaret, daughter of Robert III. and wife to one of the earls of Douglas. The college is situated upon a small stream called Cluden, about two miles from its junction with the river Nith, and presents in its ruins many marks of its former magnificence and grandeur.

Dundrennan Abbey, which stands in the parish of Ker-rich, about a mile and a half from the Solway frith, is also a fine ruin. It was founded in the year 1142, and has acquired celebrity as the asylum of Mary queen of Scots after the battle of Langside. Besides these, the stewartry contains several other curious remains of antiquities. The most remarkable are the *rocking stone*, in the parish of Kells, which is so nicely balanced, that it can be moved by the slightest pressure; the monastery of Tongland, the Dun of Barendland, the moat of Urr, probably the largest work of the kind in Scotland, and the castle of Kennuir, situated near the lake of that name. To these may be added the tomb of king Galdus, called Cairnholly, said to have been erected to commemorate the fall of that prince in a battle between the Scots and Picts about the year 82, or, according to another tradition, in memory of bishop Whitehorn and other gentlemen, who were killed in an action with the English about the year 1150. Which of these accounts is the correct one it is perhaps impossible to determine. This, however, is certain, that this stewartry was the scene of many sanguinary contests, particularly during the invasions of the Romans, and during the contentions of Bruce and Baliol.

The principal country seats in the stewartry are those of the earl of Selkirk, Mr. Murray of Broughton, and a large house built by the late sir Samuel Hannay, the exterior of which is wholly formed of the most beautiful granite. The chief products of this district, besides those already noticed, are sheep and black cattle for the English market. It has given birth to few remarkable characters, except Thomas Gordon, famous for his writings in the Bangorian controversy, and Paul Jones the celebrated pirate, who spread so much terror over different parts of the coast during the American war.

A very interesting and well written account of this district, was published in 1810, entitled "General View of the Agriculture of Galloway; comprehending two counties, viz. the Stewartry of Kirkcubright, and Wigtonshire," by the Rev. Samuel Smith, minister of Borgue.

KIRKHAM, a small market town and parish in the hundred of Amounderness, Lancashire, England, is situated in a tract of country called the File-lands, between the Ribble and another small river. It is 22 miles distant from Lancaster, and 225 from London; and contained, according to the return under the population act of 1800, 363 houses, inhabited by 1561 persons. The chief trade is in coarse linen and sail cloth. Here are a well endowed free-school for the education of 100 boys, and a charity-school for 40 girls: two fairs are held annually, and a market weekly on Tuesdays. The Lancaster canal passes by this town, from Liverpool. One mile west of Kirkham is Ribby-hall, a large well built brick mansion, belonging to Joseph Hornby, esq. Beauties of England, vol. ix.

KIRKI, a town of Grand Bucharia; 100 miles S.E. of Bokhara.

KIRKIE, a town of Hindoostan, in the circar of Chandaree; 24 miles S.S.W. of Chatterpouur.

KIRKINTULLOCH, a small town of Dumbartonshire, situated about nine miles from Glasgow, and four from Kilsyth. The Forth and Clyde canal is carried over the small river Logie, about half a mile from this place, by an aqueduct of a single arch of great dimensions, which was considered at the time it was built as a very extraordinary specimen of masonic art. Kirkintulloch is not a place of any importance, but the country round it is populous and well cultivated, and many respectable land-holders of middling fortunes reside upon their estates, and contribute much to its improvement. It is a burgh of barony, governed by two bailiffs, annually chosen. In 1801, the number of inhabitants was 5210, of whom 1785 were employed in trade and manufacture. Its manufactures are linen and cotton.

KIRK-MOTE, a synod. See SYNOD.

Sometimes the word is also taken for a meeting in the church, or vestry. See MOTE.

KIRK-OSWALD, in *Geography*, a market town and parish in the ward of Leath and county of Cumberland, England, is seated in the pleasant vale of Eden, and is a place of some note in the early annals of the kingdom. The church dedicated to St. Oswald, the king and martyr of Northumberland, is a large irregular building, evidently erected at different periods; probably at the expense of the Dacre family, whose arms appear in various parts of the building. Here is an handsome monument raised to the memory of sir Timothy Featherstonehaugh, an active supporter of king Charles I. He was beheaded, and his two sons were slain in the battle of Worcester. A descendant of the same name resides near this town. At the west end of the church issues a copious spring of excellent water; which, in the reign of Monachism, was deemed to possess miraculous powers. The belfry tower stands on an eminence at some distance from the church. In the town is an endowed free school, and a meeting house for Dissenters. On an elevated spot, about a quarter of a mile from the town, are the ruins of a castle, which Sandford describes "as the fairest fabric that ever eye looked upon." At present only a small tower and some vaults are all that remain; but originally it was extensive, of a square form, and bounded on three sides by a foss, and on the fourth by a brook. Hugh de Morville procured a licence from king John to inclose his woods at Kirk-Oswald, to fortify his manor house, and to have there an annual fair and a weekly market. This Hugh was one of the murderers of archbishop Becket; and the weapon of assassination was kept for a long time in this fortress.

On a hill about three miles from Kirk-Oswald, near the vil-  
lage

lage of Little Salkeld, is a noted Druidical monument, called "Long Meg and her Daughters." It consists of a circular arrangement of unhewn stones; the circumference of the circle is about 350 yards. Some of the stones are 10 feet high, and from 12 to 15 feet in girth. The stone called Long Meg, about 17 feet out of the circle, is 18 feet in height, and nearly 14 feet in circumference. Pennant's Tour to Allon-Moor, 4to. Hutchinson's History, &c. of Cumberland, 2 vols. 4to. Beauties of England, vol. xi. 8vo. 1802.

**KIRK-SESSIONS**, the name of a petty ecclesiastical judicatory in Scotland. Each parish, according to its extent is divided into several particular districts, every one of which has its own elder and deacon to oversee it. A consistory of the ministers, elders, and deacons of a parish, form a kirk-sessions.

These meet once a week, the minister being their moderator, but without a negative voice. It regulates matters relating to public worship, elections, catechising, visitations, &c. It judges in matters of less scandal; but greater, as adultery, are left to the presbytery; and in all cases an appeal lies from it to the presbytery.

**KIRKSTALL**, in *Geography*, a village in Yorkshire, was formerly a place of note, and adorned with a most splendid and richly endowed abbey, of which the ruins of the church present a grand and interesting mass of ancient ecclesiastical architecture. It was founded in the reign of king Stephen for Cistercian monks. Parts of the original building still remain: the columns of the nave are massive, and support heavy, pointed arches. The side aisles are nearly perfect, as are also the nave, transepts, and choir. At the west front is a fine door-way with a semicircular arch, and above it two handsome windows, curiously ornamented. On the fourth side are several ruinous apartments, among which the dormitory and some other rooms are still covered in. "Kirkstall will be found highly interesting to the picturesque traveller, as it affords a variety of subjects for the pencil, both architectural, and where the ruins will unite finely with the landscape." This place is three miles from Leeds, and 101 from London. Dayes' Excursions in Yorkshire, 8vo. 1805, in which work is a neatly engraved view of Kirkstall, and an interesting account of the picturesque features of the country around that grand pile of ruins.

**KIRKULETI**, a river of Asia, which rises in the mountains of Armenia, and traversing the principality of Gurjel, runs into the Black sea. N. lat. 41° 55'. E. long. 41° 25'.

**KIRKUR**, a town of Hindostan, in Rohilcund; 35 miles S. of Bareilly.

**KIRKWALL**, the chief or principal town of the Orkney islands, Scotland, is seated on the northern coast of the Main-land, in the latitude of 59° 9' N. and in the longitude of 2° 30' W. of Greenwich, towards the S.E. side of the bay of the same name; and is divided into the old town that bends along the bay, and the new, which stretches a considerable way to the south. Its original name appears, from ancient authorities, to have been Kirkiovoog, or the kirk on the bay. The town has only one street, nearly a mile long, with many excellent houses ranged on each side, which, for the style of their building, and the manner in which they are finished and furnished, may bear a comparison with those of any small town in the kingdom. Several gentlemen of property reside here, and also a considerable number of shopkeepers; but the bulk of the people is composed of tradesmen, boatmen, servants, and day-labourers: and when the population of the country parish, which makes a fourth of the whole, is considered, the united parishes of Kirkwall and

St. Ola, in which are two established clergymen, contain the former about two thousand, the latter five hundred inhabitants. The town was erected into a royal borough by charters from the Scottish sovereigns, confirming all its ancient privileges: and all its rights and advantages were at last solemnly ratified by act of parliament. The government is vested in a provost, four magistrates, a dean of guild, a treasurer, and fifteen other members, who together compose a council. In this town, the sheriff, the admiral, the commissary, and the justice of peace courts, are also occasionally convened for the administration of law; and for the cognizance and regulation of ecclesiastical matters: the three presbyteries, of which the provincial synod is composed, and sometimes the synod itself, meet at least once a year, or oftener, according to circumstances. Here are also a custom-house, a post-office, and a store-house, into which are collected the rents, that are mostly paid in kind, of both the bishopric and earldom, which are generally let on lease to merchants, who sometimes dispose of them here, and sometimes send them out of the country. Kirkwall, with the four northern burghs, Wick, Dornock, Tain, and Dingwall, choose a burghs to represent them in the British parliament. The principal modern building is a town-house, divided into apartments respectively appropriated to a prison, an assembly-hall, a court of justice, and a lodge of freemasons. At a small distance are school-houses for the several branches of education. These structures, however, are but trifling, compared with the relics of the bishop and earl's palaces, the castle, once a place of great strength, and the venerable cathedral of St. Magnus: but for nothing is the town more celebrated than for its excellent harbour, which is broad, safe, and capacious, with a bottom of clay so firm, and a depth of water so convenient, as to afford anchorage for ships of a large size, and in great numbers. Towards the south-east side, are still visible the vestiges of a rude temporary fort, thrown up on an emergency by Oliver Cromwell; and on the opposite side another of the same kind has been evidently marked out for co-operation in either annoying or protecting the harbour. Most of the lands in the parish of St. Ola, which surround Kirkwall, formerly made part of the temporality of the bishopric of Orkney, and were separated at the Reformation, or on the prospect of the abolition of episcopacy. Some additional particulars relating to this town, and to places in its vicinity, will be given in a subsequent article, under the word **ORKNEYS**. In the interim, the reader is referred to an interesting volume published in 1808, entitled "History of the Orkney Islands," &c. by the Rev. Dr. Barry: second edition, with corrections and additions, by the Rev. James Healdrick.

**KIRLAK**, an island of a triangular form in the Frenzen sea, about 240 miles in circumference. N. lat. 71° 30' to 72° 15'. E. long. 221° to 126°.

**KIRMANSHA**, or **KIRMONCHA**, a town of Persia, in the province of Irak; 145 miles N.E. of Bagdad. N. lat. 34° 35'. E. long. 46° 30'.

**KIRN**, a town of France, in the department of the Rhine and Moselle, and chief place of a canton, in the district of Simmern; 17 miles W. of Creutznach. The place contains 1240, and the canton 4084 inhabitants, in 18 communes. N. lat. 49° 47'. E. long. 7° 26'.

**KIRNBERGER**, **JOHN PHILIP**, in *Biography*, a German musician, much respected as a learned contrapuntist, was born in 1721, at Saalfeld, in Thuringia, a province of Saxony; at the age of eighteen he went to Leipzig, where he studied under Sebastian Bach till 1741, when he went into Poland, where he was admitted into the service of several Polish princes; and afterwards appointed director

rector of the music at a convent. In 1751, he went to Dresden, where he studied the violin under Fickler, and some time after entered into the service of the king of Prussia, as a performer on that instrument. About the year 1756, he was appointed court musician to her royal highness princess Amelia of Prussia. The harpsichord, which was his first, was likewise his best instrument, and his compositions for that and the organ were very numerous, as well as his polemical and theoretical writings. Besides these publications, he was editor of four collections of harpsichord pieces, which included several of his own; and of all these he marked the fingering according to the rules of Emanuel Bach.

During the last years of his life, his knowledge in the laws of harmony made him regarded as the *Pepusch* of Berlin; but being gifted with less temper than the venerable organist of the Charter-house, his critical quarrels kept his mind in perpetual perturbation. Naturally grave and austere, he was said to be rendered more so by opposition and disappointment.

His fugues and church music are models of correct counterpoint, but too elaborate and dry for the public. He never seems to have aspired at, or thought of, facility, grace, and elegance. His ambition seems to have been to shew what could be done by labour and study, which had never been attempted before, and which, when achieved, amused the eye much more than the ear. He seems to have created giants which none could vanquish but himself. His musical institutes manifest great meditation and science; but will be intelligible to none but those who have already advanced far into the mysteries of counterpoint.

This profound musician, whose knowledge in all the laws and subtleties of canon, fugue, and modulation, were indispensible, but who, in his latter days, appeared to be more ambitious of the character of an algebraist than a musician of genius, now and then suffered fine passages, and even whole movements, to escape him; which proves that, like his great master Sebastian Bach, if he had condescended to be less artificial, he was possessed of the means of exciting, by his abilities, delight as well as wonder. See his *Institutes*, pp. 242 and 243, where the composition is admirable, clear, neat, and pleasing. This able professor died at Berlin, in 1773, at the age of sixty-two years.

KIRNEE, in *Geography*, a town of Hindoostan, in Bahar; 48 miles S.W. of Arrah.

KIROLL, a town of Hindoostan, in Doob; 28 miles N. of Etaya.

KIROO, a town of Bengal; 24 miles N. of Tomar.

KIRRIEMUIR, commonly pronounced Killamoor, a town and parish of Angus-shire, Scotland, is built on the S.W. side of a hill near a romantic glen, through which flows the small river Gairie. This town is 16 miles from Dundee, 20 from Arbroath, six from Forfar, and 75 from Edinburgh. Here is a large weekly market; and the town contains some considerable manufactories for Osnaburghs and coarse liens. In the year 1792, the value of these goods, manufactured here, and in the immediate neighbourhood, was about 30,000*l.* sterling. The town is a burgh of barony, but the date of its charter is unknown. In the population report of 1800, this town was returned as containing 949 houses, and 4421 inhabitants; but it is presumed this total must include the whole parish, as in a previous census for 1793, the town is said to have comprised only 1584 inhabitants. The parish consists of an area measuring about eight miles in length by six in breadth, and is beautifully diversified by hills, dales, woods, and plains.

At Kinnordy, Mr. Lyall has a handsome seat, with fine plantations; and at Clova, the seat of Mr. Ogilvie, the woods are abundant, and serve to beautify the aspect of the country. At Invercarty is a large castle formerly belonging to the Ogilvies. Sinclair's Statistical Account of Scotland.

KIRSANAFF, a town of Russia, in the government of Tambov, seated on the Vorona, which falls into the Khoper; 56 miles S.E. of Tambov.

KIRSHEHR, a town of Asiatic Turkey, in Natolia, and capital of a district; formerly a considerable city, and called "Diocæsaria." In the vicinity salt is manufactured; 84 miles N. E. of Cogni. N. lat. 39° 12'. E. long. 34 13'.

KIRSHEHCH, a town and district of the government of Volodimir, in Russia, seated on a rivulet that falls into the Khasma.

KIRSOVA, a town of European Turkey, in Bulgaria, on the Danube; 30 miles S. of Galatz. N. lat. 44° 50'. E. long. 27° 30'.

KIRSTENIUS, PETER, in *Biography*, a learned physician, was born at Breslau, in Silesia, on the 25th of December, 1577, where his father was a merchant. He lost his parents when he was very young, but his guardians took good care of his education, intending him for his father's profession. He early evinced, however, a passion for letters, which they did not think proper to control, and left him to indulge it to the utmost. He learned the Greek and Latin languages, and paid considerable attention also to the Hebrew and Syriac; at the same time, as he now began to look to medicine as his object, he cultivated natural philosophy, anatomy, and botany, with the greatest assiduity. He afterwards studied at the universities of Leipzig, Wittenberg, and Jena, where he was much distinguished among his fellow-students, and determined upon farther improving himself by traveling. He had been told, that no person could obtain a high rank in the practice of physic, unless he understood Avicenna; and knowing the translation of that physician's work to be bad, he had a strong inclination to learn Arabic. To this he was urged by Joseph Scalger and Isaac Casaubon, who judged that he was capable of rendering great service to the republic of letters in that way; and he resolved to read not only Avicenna, but also Mesue, Rhafes, Avenzoar, Albukasis, and Averroës. This passion, however, did not prevent him from gratifying the inclination which he had to travel, and he accordingly spent seven years from home. He first went through the Low Countries into France, and thence to Switzerland, where he received the degree of M. D. from the university of Basle, at the age of twenty-four. He then continued his travels, visiting Italy, England, and Spain, and reaching even Greece and Asia.

Soon after his return to Silesia, he was appointed by the magistrates of Breslau to be director of the college and schools of that city. But he afterwards resigned that difficult employment, and applied himself entirely to the practice of physic and to the study of Arabic, with which he became so enamoured, that he resolved to promote the knowledge of it by establishing an Arabic press, and employed all the money he could spare in accomplishing that object; refusing, at the same time, the most honourable offers from courts and universities, which would have interfered with his project. He afterwards retired into Prussia, still with the intention of fulfilling his designs, and pursuing his favourite studies; but obtaining the friendship of chancellor Oxenstiern, he was induced to accompany him in a journey to Germany. While at Erfurth, Kirstenius received the offer

of a professorship, which he accepted. But his patron induced him, nevertheless, to quit this university, and to accompany him to Sweden, where he was appointed professor of medicine, in 1636, and soon afterwards physician to the queen. His constitution, however, was considerably impaired, and he did not enjoy these advantages above four years; for he died on the eighth of April, 1640, in the sixty-third year of his age. The epitaph, inscribed by Schröer to his memory, eulogizes his extraordinary knowledge of languages, of which, it is there said, he was acquainted with twenty-six.

He published several works, for which divines are as much indebted to him as those of his faculty. These are, 1. "Grammatica Arabica."—2. "Triâ Specimina Characterum Arabicorum."—3. "Decas sacra Canticorum et Carminum Arabicorum ex aliquot MSS. cum Latina ad verbum interpretatione."—4. "Vitæ quatuor Evangelistarum ex Antiquissimo Codice MS. Arabico erute."—5. "Liber secundus Canonis Avicennæ, typis Arabicis ex MSS. editus, et ad verbum in Latinum translatus, &c."—6. "Liber de vero Ufu et Abusu Medicinæ."—7. "Hypotyposis, five, Informatio Medicæ Artis studiose perutilis, aliquandiu in Pharmacopolio versaturo."—8. "Nota in Evangelium S. Matthæi ex collatione Textuum Arabicorum, Syriacorum, Ægyptiacorum, Græcorum, et Latinorum."—9. "Epistola S. Judæ ex MSS. Heidebergensi Arabico ad verbum translata, &c." Hutchinison Biog. Med. Eloy. Dict. Hist.

KIRSTENIUS, GEORGE, also a physician, was born at Stettin, in January, 1613. He pursued his studies, during several years, at Jena and Strasburg, and afterwards travelled through Germany and the Low Countries. He was invited to professional chairs in the universities of Gripswald and Derp; but the political troubles of the times prevented him from accepting them: he determined at length to settle at his native place, and contented himself with a professorship in the Royal College of Stettin. He died on the 4th of March, 1660. The greater part of his life was passed in useful research, and he obtained a high reputation in his profession. He left several learned essays, in Latin, on the secretion of milk, on wounds of the head, on the sight, smell, taste, &c. which were esteemed in their day; and he published also the following works: "Oratio de Medicinæ dignitate et præstantia," 1647.—"Adversaria et Animadversiones in Joannis Agricolæ Commentarium in Poppium et Chirurgiam parvam," 1648.—"Disquisitiones Phytologicæ," 1651. Eloy. Dict. Hist.

KIRTI, in *Hindoo Mythology*, a name of Parvati, the consort of Siva.

KIRTLE, a term used for a short jacket; also for a quantity of flax, about a hundred weight.

KIRTON, or KIRKTOWN, in *Geography*, a large village and parish in the division of Holland, and county of Lincoln, England, has been a place of considerable size and importance, but from having lost its weekly market, and being out of a public road, and divested of manufactures, is now reduced to the rank of a village. In the year 1800, it contained 269 houses, and 1238 inhabitants. Kirton has long been famed for its large and elegant church, which was formerly collegiate, and, according to some writers, was built by Alexander, bishop of Lincoln, in the time of king Henry I. This statement is, however, evidently erroneous, for the style of architecture marks it to be as late as the early part of the 15th century. Being much injured by neglect, and larger than necessary for the population of the parish, the chancel, tower, and transepts were taken down in the year 1806. A new tower was, however, erected at the west end

of the church with the original materials. At the western end of the nave is a semicircular arch, probably of the age of the bishop above named. In the church is a handsome octangular font, on the pedestal of which is an inscription, stating, that it was made for Alauin Burton, in the year 1405. Beauties of England, vol. ix. 1807.

KIRTON *Lindsey*, a market town and parish in the wapentake of Corringham, in Lindsey division of the county of Lincoln, England, is situated 20 miles from Lincoln, and 147 from London. The inhabitants were returned under the population act as 1092, the houses as 243. Dr. Stukely states, that John of Gaunt had a palace here. At this place Mr. Pegge places the Sidnaceiter of the Romans. See Gough's edition of Camden's Britannia, vol. ii. p. 266. ed. 1789.

KIRWANI, a town of Africa, in the country of Dentela, in which Mr. Park saw some iron smelting-furnaces; 20 miles W. of Baniferile. N. lat. 12° 30'. W. long. 11°.

KIRWEILER, a town of France, in the department of the Lower Rhine; 15 miles N. of Strasburg.—Also, a town of France, in the department of Mont Tonnerre; 18 miles S. of Lauterburg.

KIRZAK, a town of Russia, in the government of Vladimir; 48 miles W. S. W. of Vladimir.

KIS, in *Natural History*, a name given by some people to the common pyrites; and by others to a peculiar kind of it, containing copper, and a small quantity of silver.

KISAK, in *Geography*, an island near the S. W. coast of East Greenland. N. lat. 59° 51'. W. long. 45°.

KISERYA, a town of Hindoostan, in Bahar; 32 miles S. S. E. of Bettiah. N. lat. 26° 20'. E. long. 85° 6'.

KISH, or KESH, a post-town of Ireland, in the county of Fermanagh; 93 miles N. W. by N. from Dublin.

KISI, a land-bank in the Irish sea, about six miles long, and hardly one wide; 7 miles from the coast of the county of Dublin. N. lat. 53° 15'. W. long. 5° 54'.

KISHCORRAN MOUNTAINS, a long ridge of mountains in the southern part of the county of Sligo, Connaught, Ireland, on the summits of most of which are very large cairns. Beaufort.

KISHENAGUR, a circar of Bengal, lying on the E. side of the Hoogly, about 110 miles long, and from 7 to 30 broad.—Also, the capital of this circar; 45 miles N. of Calcutta. N. lat. 23° 23'. E. long. 88° 38'.—Also, a town of Hindoostan; 15 miles S. of Aumimere.

KISHMA, KISHMISH, *Kijmich*, or *Djijme*, the largest island in the Persian gulf, 30 miles long and from six to eight broad. A narrow channel separates it from the continent of Persia, navigable, but dangerous, on account of pirates. This island contains three or four towns or villages, one of which, on the N. coast, is called by the same name. N. lat. 26° 54'. E. long. 56° 50'.

KISHNUKOOD, a town of Persia, in the province of Segestan; 36 miles W. of Candahar.

KISHTAC, an island in the N. Pacific ocean, E. of Foggy Cape, opposite to the mouth of Cook's river; about 100 miles long, and from 30 to 50 broad. N. lat. 57° to 58° 40'. W. long. 152° 30' to 154° 50'.

KISHTEWAR, a country of Asia, lying S. E. of Cashmere, near the banks of the river Chunaat. Its capital, called Muddul, or Mundul-Muder, is situated about three coffes E. of this river.

KISI-HISAR, a town of European Turkey, in Bulgaria; 36 miles N. E. of Sofia.

KISLE-DARIA. See KIESL.

KISKEMANITAS, a river of America, which is a branch

branch of the Alleghany, into which it discharges itself. N. lat.  $40^{\circ} 40'$ . W. long.  $79^{\circ} 42'$ , in Westmorland county, Pennsylvania. Its headwaters are, Little Cone-maugh and Stone creek, which after their junction assume the name of Cone-maugh river. After receiving other waters it takes the name of Kilkemanitas. It is navigable for bateaux 40 or 50 miles, and good portages are found between it and Juniatta and Potowmac rivers. Coal and salt are discovered in the vicinity of these rivers.

KISKIN-OSTROG, a town of Russia, in the peninsula of Kamtschatka; 52 miles W. of Verchnei-Kamtschat-fkoi.

KISKO, a town of Sweden, in the province of Nyland; 12 miles N. of Eknas.

KISLAK, a town of Poland, in the palatinate of Braclaw; 20 miles E.S.E. of Braclaw.

KISLAR. See KIZLAR.

KISMA, a town of Persia, in the province of Ghilan; 21 miles W.N.W. of Rehd.

KISMALO, a town of Hungary; 12 miles N.N.E. of Gran.

KISSABATTY, a town of Bengal; 22 miles S.E. of Burdwan. N. lat.  $23^{\circ} 2'$ . E. long.  $88^{\circ} 18'$ .

KISSAMOS, a small town, formerly the harbour of "Aptera," which gives name to a district or province in the north-western part of the island of Crete. This town would be of some importance, if the pachas had not prohibited the exportation of the commodities of the island, except from the chief place of their government. This province is one of the best cultivated and most productive of the island; it furnishes a tolerably large quantity of oil and wine; it produces honey, wax, and silk; but little barley and wheat. Its mountains are for the most part wooded; and among the trees are scattered many common and horn oaks, the acorns of which allow the Greeks to breed a large number of hogs. Here are also many carob-trees, whose fruits are carried to Canea. In this province the vine deserves attention, which produces grapes with one hoeing and without any manure. The wine of Kissamos is a claret, spirituous, and of a tolerably good quality. As it is not an article of commerce, the Greeks convert a part of it into brandy for their winter stock. On the gulf of Kissamos is a quarry of beautiful gypsum. The fort of "Grabufas," situated on a steep islet, at the most western and northern part of Crete, is comprised in the district of Kissamos. The junction of these small islands and an advanced cape form a natural harbour, in which the largest ships anchor in safety. The population of the Turks of Kissamos is estimated at upwards of a third of the inhabitants. See CANDIA.

KISSEE, or KISSEY, a town of Africa, in the country of Sierra Leona, at the head of a river of the same name, eight journeys from Teembo. According to Dr. Azelius the town of Kissley may be, in direct distance, about 56 geographical miles to the N.E. by E. of Sierra Leona.

KISSEL, JOHN VAN, in *Biography*, a painter of portraits and still life. He was born at Antwerp in 1626. Nature was his guide in the practice of the art he professed, and it was his constant custom to make sketches of all his various productions at the different seasons of the year; merely sketching some, and colouring and even modelling others; by these means he possessed a large stock of things ready to his hand for composition, and he executed them with great taste and delicacy.

He demanded so high a price for his productions, that few could purchase them. Among those who did was the king of Spain, who, after having obtained many of his

works, at last gained possession of the painter also. He was appointed painter to the queen of Spain, and was retained in her service as long as he lived.

His portraits are very highly esteemed, being executed with a light free touch, and a tone of colour that very much resembles Vandyke's. He died in 1708, at the age of 82.

KISSELPUR, in *Geography*, a town of Bengal; 35 miles S.S.W. of Doofa. N. lat.  $22^{\circ} 32'$ . E. long.  $84^{\circ} 41'$ .

KISSER, a town of Africa, in Tunis; 18 miles S.E. of Sbeah.

KISSI, Sr., a small island in the Grecian Archipelago. N. lat.  $38^{\circ} 43'$ . E. long.  $24^{\circ} 10'$ .

KISSIMA, a town of Japan; 45 miles N. of Nan-gasaki.

KISSINGEN, a town of the duchy of Wurzburg, on the Saal, in the environs of which are some medicinal- and salt springs; 24 miles N. of Wurzburg. N. lat.  $50^{\circ} 14'$ . E. long.  $10^{\circ} 17'$ .

KISSOREGUNGE, a town of Hindoostan, in Bundelcund; 18 miles S.E. of Chatterpouur.

KISSUNPOUR, a town of Hindoostan, in Bahar; 11 miles N. W. of Bahar.

KIST, a word used by Paracelsus as the name of a weight, equal to 14 grains.

KISTNA, in *Geography*, a town of Hindoostan, in the Carnatic.

KISTNABARAM, a town of Hindoostan, in Myfore; 13 miles S. of Tadameri.

KISTNAGHERI, a town and fortrefs of Hindoostan, in the Myfore country; 90 miles E. of Seringapatam. N. lat.  $12^{\circ} 30'$ . E. long.  $78^{\circ} 22'$ .

KISTNAGUR, a town of Bengal; 24 miles N. of Goragot.—Also, a town of Bengal; 16 miles S. of Nagore. N. lat.  $22^{\circ} 52'$ . E. long.  $87^{\circ} 21'$ .

KISTNAH, a river of Hindoostan, which rises in the mountains of Vissapour, about 20 miles from Sattarah, and after obliquely traversing almost the whole extent of Hindoostan, from W. to E., discharges itself, by several mouths, into the gulf of Bengal, between Masulipatam and Nizapatam, in the circar of Guntoor. The Godavery and Kistnah, approaching one another in their descent towards the sea, inclose a tract of country, for an account of which, (see DELTA.) The islands, formed by the mouths of the Kistnah, are very fertile, and produce grain, excellent timber, and some of the best tobacco in India; and besides, the low grounds, which at spring tides are overflowed, produce a shrub of great use in dyeing chintzes and callicoes.

KISTNAPORAM, a town of Hindoostan, in the Carnatic; 25 miles W.N.W. of Tritchinopoly.

KISTNAPORUM, a town of Hindoostan, in Golconda; 48 miles S. of Hydrabad.

KISTNAVERAM, a town of Hindoostan, at the mouth of a river, which runs into the bay of Bengal; 15 miles S.E. of Nellore. N. lat.  $14^{\circ} 16'$ . E. long.  $80^{\circ} 11'$ .

KISTVAEN, or CIST-VAEN, in *British Antiquities*, a stone chest, coffin, or cavity for the interment of the human body, after its decease. Many antiquarians have confounded this subject with the Cromlech, and have thus confused their readers, and indeed have bewildered themselves. Some even call the perpendicular, or standing stones of the Cromlech, by the appellation of Kistvaen, and the horizontal, or covering-stone, the Cromlech. This is multiplying terms without meaning or utility. Kistvaen is a compound word from the British language, and literally signifies a chest of stone; *i. e.* Cijl, a chest or coffer, and

*Vaen*, from *Maen*, a stone: the *m* in British being commonly changed to *v* in composition. The Kiltvaen decidedly differs from the Cromlech, the first being always immersed, or covered over with many stones, when the whole is called *cairn*, or by a heap or mound of earth, which is called barrow. Mr. Owen describes the Ciltvaen "as a kind of cell formed by placing four flat stones together in a square, with another laid on the top for a cover." In some instances, however, the cist is formed by five, six, or seven stones, raised on their edges, and covered by two or three flat stones. In Berkshire, near the track of the ancient Ridge-way, on the downs, in the vicinity of the White-horse Hill, are some remains of a monument of this class. The upper part of a barrow being removed, several large stones were discovered, some of which were set up edge-ways, and others placed flat, or horizontally. Three of large dimensions formed the sides and end of a cell, which was nine feet from east to west, by about six feet from north to south. At the mouth, or entrance towards the west, were two upright stones, forming jambs, between which was a passage to the cist. Several other stones were placed near the entrance, and the barrow appeared to have been surrounded with a circle of stones. (See Beauties of England, vol. i.) "In the various practice of the Britons, the Ciltvaen sometimes contained the urn which preserved the precious ashes of the deceased; but it often contained the ashes and bones without any urn." (Caledonia, by Chalmers, vol. i. p. 84.) Toland thinks that Kiltvaens were altars for sacrifice: and some writers have conjectured that they were intended for cells, or dungeons to confine prisoners. "In Cornwall, and elsewhere, we find Kiltvaens (of an area equal to the size of the human body) consisting of side stones pitched on end, without any covering stone: these certainly once inclosed bones of the dead, though now generally dug up to search for money." Borlase's "Antiquities of Cornwall," p. 228: see also p. 225. Gough, in his "Sepulchral Monuments of Great Britain," vol. i. p. 16, &c. has given accounts of the contents of several Kiltvaens. See also Stukeley's "Abury" and "Stonehenge." King's "Monimenta Antiqua," vol. i. pp. 232, 253, 267. Rowland's "Mona Antiqua." Davies' "Mythology and Rites of the Druids," p. 394. "Archæologia," vol. ii. pp. 256, 362.—iii. 116.—iv. 114.—xii. 328.—xiv. 227. Jamieson's Etymological Dictionary. Douglass's "Nenia Britannica," folio.

**KISWARDA**, in *Geography*, a town of Hungary; 17 miles E. of Tokay.

**KISZENAU**, or **KITZNU**, a town of European Turkey, in Moldavia; 72 miles E. of Jassi. N. lat. 47° 13'. E. long. 29° 30'.

**KIT**, in *Music*, the name of a small violin of such form and dimension as to be capable of being carried in a case or sheath in the pocket. Its length, measuring from the extremities, is about sixteen inches, and that of the bow about seventeen. Small as this instrument is, its powers are co-extensive with those of the violin.

**KIT**, in *Laboratory Works*, a composition made of resin glib., pitch glib., bees-wax glib., and tallow lb., used for the last covering of carcases. This is used, when previously pounded and rendered completely liquid.

**KIT** is likewise used, among dragoons, to denote their lot of necessaries, collected and packed up in a small compass. The term is also applied, among the infantry, to the contents of a soldier's knapsack.

**KIT**, in *Rural Economy*, in some places, a name given to a milking-pail or vessel in the form of a churn, with two ears and a cover, used to convey milk in by horses or other means, in country situations.

**KITAIJELIA**, in *Botany*, so named, by Willdenow, in honour of Dr. Kitaib, one of the authors of the splendid work, entitled *Plante Rariores Hungariae*, which was published in imitation of Jacquin's *Flora Austriaca*. and intended as a continuation or sequel of that book. Willd. Nov. Act. Soc. Nat. Scrut. Berol. v. 2. 107.—Curt. Mag. t. 821. Clafs and order, *Monadelphica Polyandria*. Nat. Ord. *Cuniliferæ*, Linn. *Malvaceæ*, Juff.

Eff. Ch. Calyx double; the outer one seven, or nine-cleft. Capules single-seeded, forming a roundish, five-lobed head.

*K. vitifolia*. Willd. Sp. Pl. v. 3. 800. Waldst. et Kitaib. Pl. Rar. Hung. v. 1. 29. t. 31.—A native of Sclavonia. This plant, when wild, rises to the height of seven or eight feet, and is entirely covered with small viscid glanduliferous hairs. *Stem* round, even, not striated. *Leaves* alternate, on footstalks, five-lobed, unequally toothed; the intermediate lobe longer than the rest, pointed. *Footstalks* round, the lower ones as long as the leaves, the upper shorter. *Stipules* ovate, rather heart-shaped, bifid. *Flowers* axillary, generally about three, pedunculated. *Inner calyx* villose, smaller than the outer one. *Petals* white, wedge-shaped, truncate, a little smaller than the segments of the outer calyx.

**KITANESJO**, in *Geography*, a town of Japan, on the N.W. coast of the island of Niphon. N. lat. 36° 40'. E. long. 137° 30'.

**KI-TCHANG**, a town of Corea; 65 miles S.S.E. of Kang-tcheou.

**KITCHEN**, a room appropriated to the dressing of meat, and furnished with suitable accommodations and utensils for that purpose. See **BUILDING**.

The kitchen in the king's household is under the direction and management of a clerk-controller, who has a salary of 500*l.* a-year, subordinate clerk at 250*l.* a-year, first clerk at 150*l.* a-year, junior clerks, two master-cooks, the salary of the first being 237*l.* 10*s.* a-year, and of the second 217*l.* 10*s.* a-year, yeomen, grooms, &c.

**KITCHEN-GARDEN**, that sort of garden which is principally destined to the growth of different sorts of culinary vegetables and roots.

The land designed for this sort of garden should be sufficiently spacious, of a good depth and quality of mould, dry, and at the same time well situated for warmth, and the influence of the sun.

The soils and situations which are the most adapted for this purpose, as well as the forms and modes of laying them out, have been already fully explained in speaking of gardens in general. The great expense of cultivating kitchen gardens by means of hand-labour, however, renders it essentially necessary that they should be so contrived, as to have the principal part of the work executed in other ways, as by the use of small teams. In this way much money may in numerous instances be saved, and at the same time the labour be equally well performed. Mules and large asses have been found extremely beneficial in this intention, in a great number of situations. See **GARDEN**.

**KITCHEN-GARDEN PLANTS**, the common name of all such plants as are cultivated for the purpose of food, in gardens of this kind.

*Names and Sorts of Plants, with Modes of Culture respectively.*

*Agaricus campestris*, the field agaric or mushroom. Cultivated by the spawn of the root, or invisible seed, running in lumps of earth or dung, in the autumn season.

*Allium*, garlic, onion, leek, &c., of the first kind, large white

white garlic and red garlic—By the cloves of the root when separated.

In the second, or rocambolè fort—By the root and bulbs from the stalk.

In the third, or onion kind, as the common oval Strasbourg onion, great oval Portugal onion, flat white Spanish onion, flattened Spanish onion, silver-skinned onion, bulbless rooted Welch onion—By seed annually, which should be sown at different times in the early spring months.

In the fourth fort, as chives or cives—By dividing the roots, and planting them out in the spring.

In the fifth kind, the escalot or shallot—By offsets of the root planted out in spring.

In the sixth fort, or Canada tree-onion—By offset bulbs of the root, and the bulbs at the top of the stalk, planted out in spring.

In the seventh, or the leek kind, as the broad-leaved London leek, narrow-leaved leek—By seed annually, which should be sown in the early spring.

*Anethum, dill*, &c.; common dill—By seed annually, sown in the spring.

Fennel, light-green leaved, dark-green fennel, sweet-seeded fennel—By seed sown in spring; also by slipping the old roots, and planting them out in the autumnal season.

Italian fennel—By seed annually, sown in the spring. *Angelica javita*, common angelica—By seed annually, sown in spring.

*Apium*, parsley, celery, &c.; parsley, common plane-leaved parsley, curled leaved common parsley, broad-leaved, or large rooted parsley—By seed sown in spring.

Celery, common upright celery, upright celery with solid stalks, turnip-rooted spreading celery—By seed sown in the spring, for transplanting in summer and autumn.

*Asparagus officinalis*, common asparagus—By seed sown in the autumn, and when once raised, the roots abide for some years.

*Atriplex hortensis*, garden orach, white-leaved garden orach, green orach, purple orach—By seed annually sown in the spring season.

*Beta vulgaris*, beet, common culinary beet, green-leaved culinary beet, white beet, chard, or great white Swiss beet, mangel wurzel beet—By seed annually sown in the spring months.

Red beet, large long red-rooted beet, turnip-rooted red beet, red-rooted beet with green leaves, pale-red beet—By seed annually sown in the early spring.

*Barago*, borage—By seed annually sown in autumn or spring.

*Braffica*, the cabbage, cauliflower, broccoli, turnip, &c. The cabbage fort, small early summer cabbage, dwarf early sugar-loaf-shaped cabbage, large hollow sugar-loaf-cabbage, early Ruffia cabbage, common round white cabbage, long-sided hollow cabbage, oval hollow cabbage, flat-topped cabbage, musk-scented cabbage, giant cabbage, red cabbage—By seed annually sown at different times, in spring and autumn, for use all the year, by having the plants set out at various times.

Savoy cabbage, common green curled savoy, large green Dutch savoy, yellow savoy—By seed annually sown in spring, for autumn and winter use.

Laciniated, and other open-leaved coles, green curled borecole, red curled borecole, thick-leaved curled borecole, finely fringed borecole, broad erect curled-leaved Siberian borecole, or Scotch cole or kale, red and green common

plane-leaved green colewort—By seed annually sown in spring and summer, for plants for autumn and winter use.

Turnip cabbage, turnip cabbage with the turnip above ground, with the turnip under ground—By seed sown annually in spring and summer.

The cauliflower forts, early cauliflower, late cauliflower—By seed sown annually in spring and autumn, for plants for summer and autumn use.

Italian *brassica*, or broccoli, early purple broccoli, late large purple broccoli, comprehending varieties, with blue, brown, green, and yellow heads, dwarf purple broccoli, white or cauliflower broccoli, black broccoli—By seed sown in spring and beginning of summer, for plants for autumn, winter, and spring use.

The turnip, early Dutch turnip, white round turnip, green-topped turnip, red-topped turnip, yellow turnip, oblong white turnip, long white-rooted French turnip, round purple French turnip—By seed sown in spring and summer, for plants for use most part of the year.

*Calendula officinalis*, common marigold—By seed sown annually in spring, summer, or autumn.

*Cichorium endivia*, endive, green curled endive, white curled endive, broad-leaved Batavian endive—By seed sown annually, in summer, from May till July, for plants for autumn and winter use.

*Cochlearia armoracia*, horse radish—By pieces of the roots planted out in spring, for use for most part of the year.

*Crambe*, sea-cabbage or colewort, the different varieties—By seed sown in spring; but when once raised, the roots remain for years, sending up shoots for use in spring and summer.

*Cucumis*, cucumber and melon, the cucumber, early short prickly cucumber, early cluster cucumber, long green prickly cucumber, long white prickly cucumber, long smooth green Turkey cucumber, large smooth white cucumber, large smooth green Roman cucumber—By seed sown annually, at different times on hot-beds, in the early spring and summer.

The melon, Romana melon, Cantsleupe melon; varieties of each, and several other sorts—By seed sown annually at different times, on hot-beds, in the spring months.

*Cucurbita*, the gourd and water melon—By seed sown annually in the spring season.

*Cynara*, artichoke and cardoon, the common artichoke, globular-headed red Dutch artichoke, oval-headed green French artichoke—By suckers from the sides of the old plants, in spring, of many years duration.

The common cardoon—By seeds sown annually in the early spring.

*Daucus carota*, the carrot, orange-coloured carrot, red carrot, yellow carrot, white carrot—By seed sown annually in spring, summer, and autumn, for use most part of the year.

*Helianthus tuberosus*, tuberous sun-flower, or Jerusalem artichoke—By pieces of the root planted annually in the spring season.

*Hypopis officinalis*, common hyssop, the several different varieties—By seed sown in spring, and by planting slips and cuttings of its branches.

*Lactuca*, lettuce, early green cabbage-lettuce, white cabbage-lettuce, brown Dutch cabbage-lettuce, great admirable cabbage-lettuce, green and white ball cabbage-lettuce, green cos-lettuce, white cos-lettuce, black cos-lettuce, spotted Aleppo cos-lettuce, brown Cilicia lettuce, Imperial lettuce, red Capuchin lettuce, green Capuchin lettuce, curled-

lettuce—By seed sown annually, at different times, in spring, summer and autumn, for plants for setting out for use most part of the year.

*Lavandula*, lavender, spike-flowered common lavender, common narrow-leaved, broad-leaved, blue-flowered, white-flowered, and dwarf lavender—By slips planted out in spring, which are of many years continuance.

*Stechas*, or French lavender—By planting slips or cuttings, and by seed, which are of many years duration.

*Lepidium sativum*, garden-cress, common small-leaved, broad-leaved, curled-leaved—By sowing seed at different times of the year, according as the plants are wanted.

*Melissa officinalis*, balm, common balm—By dividing and planting the roots in spring or autumn, which are of many years duration.

*Mentha*, mint, penny-royal, &c., green common spearmint, curled-leaved spearmint, variegated spearmint—By dividing the roots, by young plants, and by cuttings of the stalks, planted out in spring, and which continue many years.

Peppermint—By roots and plants, &c. like the former.

Penny-royal—By dividing and slipping the plants, as for the mint, and planting them out.

*Ocimum basilicum*, basil, common sweet basil, several varieties—By seed sown in spring on a hot-bed, the plants being afterwards planted out.

*Origanum marjoram*, common, wild, perennial pot marjoram, winter perennial sweet marjoram, marjorana, or annual sweet marjoram—By sowing seeds in spring, and the two former also, by slipping the roots, and planting them.

*Pastinaca sativa*, parsnip, common garden parsnip—By seed sown annually for winter use.

*Phacelia vulgaris*, common kidney-bean, dwarfs and runners, dwarf kinds, early white, early yellow, liver-coloured speckled dwarf, Canterbury white dwarf, Battersea white dwarf, large white dwarf, cream-coloured dwarf, black dwarf, sparrow-egg dwarf, amber-speckled dwarf—By seed sown annually, at different times, from April till July, or the following month.

Running kinds, scarlet runner, white variety, large Dutch runner, Battersea white runner, negro runner, variable runner—By sowing the seed like the former, but principally in the summer months.

*Pisum*, the pea, Charlton pea, golden Charlton, earliest golden Charlton, long Reading hotspur, Maister's hotspur, Spanish morotot, green noupareil, early dwarf marrowfat, large marrowfat, green rouncival or union, white rouncival, Ledman's dwarf pea, small fugar pea, large fugar pea, cluster pea, crown pea, egg-pea, sickle pea, &c.—By seed sown annually, at different times, from October till June, but principally in the early spring months.

*Portulaca oleracea*, purslane, green purslane, golden purslane—By seed sown different times in April and May.

*Potterium sanguisorba*, burnet, common garden burnet—By seed sown in autumn or spring, and parting the roots.

*Raphanus sativus*, the radish, short-topped early radish, long-topped radish, deep-red radish, pale-red, transparent, mild radish, salmon-coloured radish, small white turnip-rooted radish, small red turnip radish, large white turnip-rooted Spanish radish, large black turnip-rooted Spanish radish—By seed sown at different times, from Christmas till June or August; but the latter sorts sown principally in June and July, for autumn and winter use.

*Rofmarinus*, rosemary, some varieties—By planting layers, slips, and cuttings in spring.

*Rumex acetosa*, sorrel, common long-leaved sorrel, round-leaved French sorrel, barren sorrel—By parting the roots and the first root also plentifully by feed.

*Ruta graveolens*, rue; several varieties—By planting slips and cuttings; also by feed.

*Salsvia*, sage, clary, &c. The sorts are; common sage, red sage, broad-leaved green sage, narrow-leaved green sage, broad-leaved hoary sage, sage of virtue, worm-wood sage, &c.—By planting slips in April, May, and June; also by sowing the seed in the spring season.

Clary—By seed sown annually in the spring.

*Satureja*, savory, winter perennial savory, summer annual savory—Both by seed sown in the spring season, and the former also by planting slips.

*Scandix cerefolium*, chervil, annual garden chervil—By feed annually, in August, for winter and spring use, or sown also in spring and summer, for succession crops.

*Scorzonera*, scorzonera, Spanish scorzonera—An eatable root, raised from seed sown in spring.

*Sinapis*, mustard, white mustard, black mustard, field or wild mustard; the former to use young in salad, and the two last for their seeds, to make the table sauce called mustard—By feed in spring; or, if for fallads, at any time of the year.

*Sium sibiricum*, siliarium or skirret—An eatable root raised by planting offsets commonly of the root; also by feeds.

*Smyrniolum olusatrum*, Alianders, or common Alexanders—By seed annually in spring.

*Solanum*, nightshade, furnishing the potatoe and tomatoe, tuberous-rooted solanum or potatoe, the common found red potatoe, early round red, oblong red, deep red, pale red, rough red, white kidney-shaped, large red-ended kidney, white round, white cluster, prolific American—By planting pieces of the roots or the roots whole in spring; also by sowing seed occasionally to obtain new varieties.

Tomatoe or love-apple; varieties—By sowing the seed annually, on a hot-bed, in the spring.

*Spinacia*, spinach, round thick-leaved or smooth-seeded, triangular leaved or prickly seeded; the former for spring and summer crops, the latter to stand the winter—By sowing annually in spring, summer, and autumn, for use most part of the year.

*Tanaacetum vulgare*, common tansey—By parting the roots, and planting in spring or autumn.

*Thymus vulgaris*, common thyme, the varieties with broad leaves, with narrow leaves, with striped leaves—By sowing seeds in March and April; also by planting slips of the roots and branches, and by cuttings; but seed is the only way to raise a quantity of the common sort; and the other methods to continue the varieties, or for a general supply.

*Tragopogon porrifolium*, fallafy—An eulent root, by feeds annually in spring.

*Tropaeolum*, Indian cress, or nasturtium, nasturtium minus, nasturtium majus; their flowers for garnish and fallads, and their seeds to pickle—Raised annually from seeds sown at different times in spring.

*Valeriana locusta*, corn fallad or lamb's lettuce—By seed sown in spring and autumn.

*Vicia faba*, the bean, early Mazagan, early Lisbon, long-pod, Turkey long-pod, toker bean, Sandwich bean, Windsor-bean, white blossomed, red-blossomed, Spanish bean, noupareil bean, dwarf fan bean, very low—By seed sown annually

nually, at different times from October until June, but principally in the early spring months.

More full explanations of the nature of the culture, application, and use of each, will be given under the different heads to which they particularly belong.

KI-TCHENG, in *Geography*, a town of Corea; 65 miles E. N. E. of Kiang-ki-tao.

KITCHIK-JOURLOU, a town of Natolia; 16 miles N. of Ibsarbeh.

KITCHWARA, a circar of Hindooftan, in Malva, bounded on the N. by the circar of Cotta, on the E. by Chandace, on the S. by Malva, and on the W. by Oudipour and Banfwaleh.

KITE, in *Ornithology*. See *FALCO Milvus*. Its motion in the air distinguishes it from all other birds; being so smooth and even as to be scarcely perceptible: sometimes it will remain quite motionless for a long while: at other times, glide through the sky, without the least apparent action of its wings, from whence it derived the old name *glad*, of the Saxon *glida*. Lord Bacon observes, that when kites fly high it portends fair and dry weather. Pliny thinks that the invention of the rudder arose from the observation made of the various motions of the tail, when the kite was steering through the air. Lib. x. c. 10.

The kite is a destructive bird to farmers, &c. on which account it is necessary to guard against its depredations as much as possible. This last purpose may sometimes be effected by laying such animal substances as have been infused in some sort of liquid with *nux vomica*, in the places where they come in order to feed.

KITE, in *Electricity*. See *CONDUCTOR*.

KITLOLL, in *Geography*, a town of Bengal; 15 miles S. S. W. of Goragot.

KITNAISE, a town of Egypt, on the left branch of the Nile; 20 miles S. of Faouf.

KIPOISKA, a town of Russia, in the government of Irkutsk, situated on the Kitoi, which runs into the Angara: 68 miles N. N. W. of Irkutsk.

KITORAH, a town of Hindooftan, in Boggilcund; 25 miles N. N. E. of Rewah.

KITRIANI, a town on the S. coast of the island of Siphanto. N. lat.  $36^{\circ} 55'$ . E. long.  $24^{\circ} 49'$ .

KITTATINNY MOUNTAINS, a ridge of the Alleghany mountains, which runs through the northern parts of New Jersey and Pennsylvania.

KITTEN ISLAND, a small island in the Mergui Archipelago, near the S. E. coast of Cat island.

KITTER, a town of Hindooftan, in Bahar; 37 miles N. of Hajypour.

KITTERY, a township of York county, in the state of Maine, incorporated in 1653, and consisting of three parishes, which contain 3114 inhabitants. It is situated between Piscataqua and York rivers, 67 miles N. of Boston.

KITTILA, a town of Swedish Lapland; 103 miles N. of Kemi.

KITTIWAKE, in *Ornithology*, a species of the gull kind, being the *larus risfa* of Linnæus: the head, neck, belly, and tail are of a snowy whiteness; behind each ear is sometimes a dusky spot; the back and wings are grey; the bill is yellow, tinged with green; the legs are dusky, and have a small knob instead of the back toe. This bird inhabits the romantic cliffs of Flamborough-head, the Bass Isle, the rocks near the castle of Slains, in the county of Aberdeen, and Priestholm-Isle. The young of these birds are a favourite dish before dinner, for whetting the appetite, in North Britain, but they have a rank taste and smell. Pennant. See *LARUS*.

KITT'S, ST., in *Geography*. See *St. CHRISTOPHER'S*.

KITWADA, a town of Japan, in the island of Niphon; 45 miles N. W. of Meaco.

KITZBUHL, a town of the county of Tyrol, on the Acha; 36 miles E. of Inspruck. N. lat.  $47^{\circ} 25'$ . E. long.  $12^{\circ} 27'$ .

KITZINGEN, a town of the duchy of Wurzburg, on the Maine; it is a large, handsome town, owing its rise to a convent of Benedictines, founded in 745 by duke Pepin. Most of the inhabitants are Lutherans; 10 miles E. S. E. of Wurzburg. N. lat.  $49^{\circ} 42'$ . E. long.  $10^{\circ} 12'$ .

KIU, a city of China, of the first class, in the province of Tche-kiang; pleasantly situated near a fine river, and between two others that run into it. It borders on Kiang-fi and Fo-kien; but to the last province the passage is difficult on account of the intervening mountains. N. lat.  $29^{\circ} 2'$ . E. long.  $118^{\circ} 39'$ .

KIVA, See *KHIEVA*.

KIVAK, a town of Persia, in the province of Khorasan; 300 miles N. of Herat.

KIVALORE, a town of Hindooftan, in the Carnatic; 8 miles W. of Negapatam.

KIVJARVI, a town of Sweden, in the government of Wafa; 70 miles S. E. of Jacobstätt.

KIUKA, a town of Sweden, in the government of Abo; 30 miles S. S. E. of Biorneborg.

KIULO, a town of Sweden, in the government of Abo; 30 miles S. S. E. of Biorneborg.

KIUN-TCHEOU, a city of China, of the first class, and capital of the island of Hainan, which see. It stands on a promontory, and ships often anchor at the bottom of its walls. Two different kinds of Mandarins command here, as in all the other provinces of China; the first are called Iterati; the second, mandarins of arms, or military officers. Its jurisdiction extends over three cities of the second class, and ten of the third. N. lat.  $20^{\circ}$ . E. long.  $109^{\circ} 38'$ .

KIURAWASI, town of Sweden, in the government of Kuopio; 15 miles N. N. W. of Kuopio.

KIUSIU, an island of Japan, also termed Saikokf, or the western country, situated on the S. W. The length of Kiufiu from N. to S. is about two degrees, or 140 British miles, and the greatest breadth about 90. See *XIMO*.

KIUTAJA, or CUTAJA, a town of Asiatic Turkey, capital of a fangiakate, and residence of the beylerbeg of Natolia, situated at the foot of a mountain, near the river Purfak, which runs into the Sakaria: It contains several mosques, and three Armenian churches. The soil is fertile, and the air healthy. Near it are some warm baths, in high estimation for several disorders; 136 miles E. of Constantinople. N. lat.  $39^{\circ} 14'$ . E. long.  $30^{\circ} 30'$ .

KIWACZE, a town of Poland, in the palatinate of Brzelsk; 20 miles E. of Brzelsk.

KIZ, a town of Kharafin; 290 miles N. W. of Samar-cand.

KIZELGICK, a town of Natolia, on or near the seite of the ancient Euronius; 9 miles N. N. W. of Melafio.

KIZIDANY, a town of Samogitia; 20 miles E. S. E. of Rosienne.

KIZILBASCH, or KEZELBASCH, a Turkish term signifying *red-head*: applied by way of obloquy to the Persians, ever since Ishmael Sophi, founder of the family last reigning in Persia, who ordered his soldiers to wear a red cap, round which is a scarf or turban with a dozen plaits in it, in memory of twelve imams, successors of Ali, from whom he pretended to descend.

Vignere writes the word *kezilbasch*, and adds, that according

to the vulgar interpretation among the Persians, the twelve plaits signify the twelve sacraments of their law. But not contented with this, he looks out for another original, and tells us there is a mystery in it, derived from the ancient paganism, when the Persians adored fire, whose heat is denoted by the red colour, which in some measure symbolizes with the sun, held by them in the highest veneration. He adds, that the twelve plaits shew the twelve months of the year, and twelve signs in which that luminary performs his course.

**KIZILERMAK**, or **KIZIL-IRMAK**, the celebrated *Haly's* of antiquity, in *Geography*, a river of Asiatic Turkey, which rises in mount Taurus, a few miles S. of Kaisarië, in Carmania, and runs into the Black sea, N. lat.  $41^{\circ} 40'$ . E. long.  $36^{\circ}$ , on the coast of the gulf of Sanfoun.

**KIZIL-KHAN**, a town of Asiatic Turkey, in Diarbekir; 12 miles W. of Merdin.

**KIZILAGADJE**, a town of Persia, in the province of Ghilan; 25 miles N. of Aftara.

**KIZILHIZAR**, a town of Syria; 8 miles E. of Antab.

**KIZIL-OZAN**, or **SEFID BUD**, called by Hanway *Sefitrood*, a river of Persia, which M. D'Anville derives from the mountain of Elwend, not far N of Hamadan; so that, by a very winding course to the Caspian sea, its length doubles what is assigned in more recent maps. This river is the Mardus of antiquity, and the Swidura of Gmelin, rising on the confines of Turkey, and falling into the sea below Langorod. It supplies numerous pike, carp, and other kinds of fish, esteemed by the Persians. Gmelin says that it abounds in sturgeon.

**KIZILRABAT**, a town of the Arabian Irak; 10 miles N.N.E. of Shehrban.

**KIZIL-FASHI**, or **TAMAN**, an island at the mouth of the river Kizil, between the Persian coast and the sea of Azoph; inhabited by Cossack Tartars. N. lat.  $45^{\circ}$ . E. long.  $37^{\circ}$ .

**KIZIZANAN**, a town of Moravia, in the circle of Brunn; 15 miles S.E. of Brunn. N. lat.  $49^{\circ} 8'$ . E. long.  $16^{\circ} 52'$ .

**KIZLIAR**, or **KISLAR**, a Russian town, fortrefs, and port, in the government of Caucasus, established in the year 1735, near the eastern coast of the Caspian, and covering the frontiers towards the limits of Persia. Vessels formerly entered the southern branch of the Terek; but as the mouths of that river are now choaked up, the merchandize is landed in a small bay, at the distance of 34 miles. Kislar draws from Altrachian the European commodities necessary for the Persian traffic, together with corn and provision for the Russian colonies on the Terek, and for the neighbouring district of mount Caucasus. Besides the goods which are disposed of at Kislar, and sent to the Persian ports, the inhabitants carry on a contraband trade to Shamakee, Derbent, and even Teflis, in Georgia, which is exceedingly precarious from the numerous banditti who pillage the caravans. The environs of Kislar are very fertile in corn and fruit, with plenty of game; 160 miles S.S.W. of Altrachian. N. lat.  $44^{\circ} 50'$ . E. long.  $46^{\circ} 44'$ .

**KIZLUK**, a town of Russia, lately in the palatinate of Braclaw; 16 miles E. of Braclaw.

**KLACKS**, a small island on the W. side of the gulf of Bothnia. N. lat.  $61^{\circ} 21'$ . E. long.  $17^{\circ} 4'$ .

**KLADNO**, a town of Bohemia, in the circle of Schlan; 10 miles N.W. of Prague.

**KLAN**, a town of Istria; 13 miles N.E. of Pedara.

**KLAN**, or *Clano*, a town of the duchy of Carniola; 28 miles E. of Treleve.

**KLANG POINT**, a cape on the S. coast of the island of Java. S. lat.  $7^{\circ} 40'$ . E. long.  $109^{\circ} 32'$ .

**KLATTAU**, a town of Bohemia, in the circle of Pilsen, built in 775, and surrounded with walls in 1000; having some silver mines in its vicinity; 21 miles S. of Pilsen. N. lat.  $49^{\circ} 24'$ . E. long.  $13^{\circ} 15'$ .

**KLEBANI**, a town of Poland, in the palatinate of Braclaw; 10 miles S. of Braclaw.

**KLEBANON**, a town of Poland, in Podolia; 60 miles N. of Kamianec.

**KLEBER**, J. B. in *Biography*, a French general, was born at Straburgh in 1759, and was bred an architect. Accident led him to enter himself into the Austrian service, in which he continued eight years, and then returning to his native country, became inspector of the public buildings in Upper Alsace. The revolution of France rekindled his military ardour, and he obtained a commission in the service. He displayed great bravery and judgment at the siege of Mayence, after which he was employed in La Vendée; but the sanguinary scenes there so disgusted him, that he obtained his recall, and was afterwards engaged in the north, where he defeated the Austrians, took Mons, and drove the enemy from Louvain. He captured Maeltricht, and contributed to the taking of several other strong places. Discontented with the Directory, he left the army and returned to Paris, where he led a private life, writing his military memoirs, till Bonaparte, being appointed general of the army of Egypt, chose Kleber as his companion. At the siege of Alexandria he was wounded on the head as he was climbing the ramparts, but he did not retire till he received a second wound. He defeated the Turks in several actions; and Bonaparte, on quitting Egypt, left Kleber in the chief command. In a short time he signed the treaty of El-Arisch with sir Sidney Smith, by which the French agreed to leave Egypt; but it was annulled by the British government, and hostilities were renewed. Kleber, though reduced, did not bend under his misfortunes, but defeated the Turks at the obelisk of Heliopolis. He next took Cairo by storm, and formed an alliance with Murat Bey; but he was assassinated by a Turk, named Solyman, who gave him four stabs with a dagger, in the year 1800.

**KLECK**, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek, 24 miles W.N.W. of Sluck.

**KLEIN**, a town of the duchy of Stiria; 12 miles E.S.E. of Landferg.

**KLEINENBERG**, a town of Westphalia, in the bishopric of Paderborn; 8 miles N.W. of Warburg.

**KLEINHOVIA**, in *Botany*, was so designated by Linnaeus, in honour of Mr. Kleinhoff, a sedulous and ingenious cultivator of the botanic garden established in the island of Java. Linn. Gen. 468. Schreb. 324. Willd. Sp. Pl. v. 2. 871. Cavan. Diss. v. 2. 288. Mart. Mill. Dict. v. 3. Julii. 278. Lamarck. Dict. v. 3. 367. Gærtn. t. 137. Clafs and order, *Dodecandria Monogynia*. Nat. Ord. *Collumiferae*. Linn. *Malvaceae*, Juss.

Gen. Ch. *Cal.* Perianth deciduous, of five, oblong, nearly equal leaves; the lower one rather shorter than the rest. *Cor.* Petals five, lanceolate, sessile, a little longer than the calyx; the upper one shorter, broader, curved and truncated; nectary central, supported by a column the length of the calyx, surrounded with glandules at the base, ascending at the top, bell-shaped, very small, divided half way down into five recurved segments. *Stam.* Filaments 15, very small, three placed on each segment of the nectary; two of them are terminal, the other rather lower; anthers of two lobes. *Pist.* Germen superior, ovate, five-sided, placed in the hollow of the nectary; style simple; stigma slightly

slightly notched. *Peric.* Capsule five-lobed, five-sided, inflated. *Seeds* solitary, roundish, somewhat mucicated.

Obf. This genus is, according to LINNÆUS, who places it in *Cynandria*, allied to *Ayenia*, but perfectly distinct from it.

Eff. Ch. Calyx of five leaves. Petals five. Nectary bell-shaped, five lobed, bearing the stamens, and affixed to the column of the germen. Capsule five-sided, inflated, consisting of five single-seeded cells.

1. *K. Hesperia*. Linn. Sp. Pl. 1365. Cavan. Diff. v. 2. t. 146.—(Catti-marus; Rumph. Amboin. v. 3. 177. t. 113.) A native of Java, Amboina, and the Philippine islands, flowering throughout the year, and bearing fruit in October.—*Stem* like that of a common apple-tree, thick, incurved, and knotty. *Branches* smooth. *Leaves* alternately scattered, somewhat heart-shaped, broad, ovate, acute, seven-ribbed, with arched veins. *Stipulas* lanceolate. *Flowers* bright purple. *Fruit* at first greenish purple, afterwards reddish. Rumphius has remarked, that the younger leaves, when bruised, emit an odour like violets, on which account the natives of Amboina wash their heads with an infusion of them. This handsome tree is universally admired among the Malays for the beauty of its foliage as well as for the firmness and excellence of its wood, of which their quivers are generally formed.

KLEINIA, named in honour of the celebrated German zoologist, James Theodore Klein, F. R. S. well known for his critical opposition to Linnaeus in that department of natural history. His claim to botanical distinction is founded chiefly on a treatise concerning the plant now called *Cacalia Kleinia*; nor would this perhaps have excited much attention, but for the absurdity of the phrase by which it distinguishes it, *Nec Cacalia, nec Cacaliastrum, an Tithymaloideis*. This is cited in the *Critica Botanica* of Linnaeus, as an instance of the confusion that must ensue from botanists not bestowing new names upon new plants.—Klein flourished in the first half of the eighteenth century, having been born in 1685, and living till 1759.—Schreb. 545. Willd. Sp. Pl. v. 3. 1738. Jacq. Amer. 215.—Class and order, *Syngenesia Polygamia Æqualis*. Nat. Ord. *Compositæ Discoidææ*, Linn. *Corymbiferae*, Juss.

Obf. For an account of the separation of this genus from *Cacalia*, see that article.

Gen. Ch. *Common Calyx* perfectly simple, oblong, cylindrical, composed of five, linear, lanceolate, pointed, equal leaves. *Cor.* compound, uniform, tubular. Florets all fertile, numerous, equal, a little longer than the calyx, funnel-shaped; tube slender, very long; limb somewhat bell-shaped, five-cleft. *Stam.* Filaments five, capillary, very short; anthers cylindrical, tubular. *Pist.* Germen superior, linear, half as long as the calyx; style thread-shaped, the length of the stamens; stigma bifid, revolute. *Peric.* none. The whole calyx is bent backwards when in fruit. *Seeds* solitary, linear; seed-down capillary. *Recept.* naked, flatfish.

Eff. Ch. Receptacle naked. Down simple. Calyx simple, equal, of five leaves.

1. *K. ruderalis*. Willd. n. 1. Jacq. Amer. t. 127. (*Cacalia ruderalis*; Swartz. Prod. 110.)—Leaves oblong-lanceolate, acute at each end, nearly entire.—Found in gravelly waste ground and on walls, in Jamaica, St. Domingo, and Martiuico.—*Root* annual. *Stem* erect, about three feet high, very smooth. *Leaves* mostly alternate, sometimes undivided, sometimes waved or cut, of a glaucous green. *Flowers* greenish-yellow, inodorous.

2. *K. Porophyllum*. Willd. n. 2. (*Cacalia Porophyllum*; Linn. Sp. Pl. 1169. Cavan. Ic. v. 3. 11. t. 222.)—Leaves elliptical, obtuse, besprinkled with transparent dots.—A

native of Peru. It flowered in the royal garden of the Escorial during the month of November.—*Stem* straight, simple, smooth, slightly striated, about a foot and half high. *Leaves* numerous, scattered, on footstalks, oval or elliptical, crenate, and dotted with small diaphanous spots. *Flowers* terminal, cylindrical.

3. *K. angulata*. Willd. n. 3. (*Cacalia angulata*; Vahl. Symb. v. 3. 92. *C. fenchifolia*; Forst. *Agypto-Arab.* n. 485.)—"Lower leaves on footstalks, oblong, toothed, angulated; upper ones lanceolate, entire."—A native of Arabia Felix.—*Stem* herbaceous, divided at the upper part, striated. The flowering *branches* elongated and naked upwards. *Leaves* very smooth, about an inch and half long. *Flowers* corymbosæ.

4. *K. suffruticosa*. Willd. n. 4. (*Cacalia suffruticosa*; Linn. Mant. 109. *C. Linaria*; Cavan. Ic. v. 3. 29. t. 257.)—"Leaves linear, entire, with pellucid dots. Stem rather shrubby."—A native of New Spain, and sent by Arduino to Linnæus from Brasil.—*Stems* about six inches high, thread-shaped. *Leaves* scattered, entire, small, fleshy. *Flower-stalks* terminal, single-flowered, erect. *Flowers* numerous, of a purple-colour, and very similar to those of *K. Porophyllum*, but the herbage is totally unlike that species.

KLEIST, CHRISTIAN EWALD VON, in *Biography*, was born at Zoeblin, in Pomerania, in 1715. His parents, who were of the order of nobility, sent him to the Jesuits' college in Upper Poland, whence he was sent to the academy of Dantzic, and afterwards to the university of Konigsberg. At the age of twenty-one he entered the Danish military service, but having an attachment to literature he did not forget the Muses amidst his other avocations. Once he was so intent on reading Milton, that he forgot to relieve guard. He did not remain long in the Danish service, but entered into that of Prussia. Frederic the Great gave him a commission in the regiment of prince Henry, and in this situation he formed an intimacy with all the great characters at Potsdam. He was particularly noticed by the king, and advanced in the army. He requested and obtained leave to take an active part in the campaign of the year 1759, but this instance of military ardour proved fatal to him, and deprived Germany of one of its best poets. He was present at the battle of Kunnerdorff, and after the most heroic displays of valour in the successive attacks of four batteries, he fell covered with wounds, of which, after much suffering, he died in the forty-fourth year of his age. His principal work, as a poet, was entitled "Spring," which was first published in 1749. On account of this poem he was called the imitator of Thomson; he is reckoned to excel in painting the sweet and beautiful scenes of nature, in a style singularly elegant and harmonious. The Spring was translated into several languages. He wrote Idyllis in the manner of Gesner, which possess great simplicity and neatness. He was author, likewise, of some moral treatises, and "Reflections on the Art of War." He published an edition of his works in 1756, with additions, among which is a description of an inundation, a piece of the terrific kind. Gen. Biog.

KLEMPENOW, or CLEMPENOW, in *Geography*, a town of Anterior Pomerania; eight miles N. of Treptow.

KLEMS, a town of Moravia, in the circle of Olmutz; eight miles S.E. of Olmutz.

KLEPOT, a town of Transylvania; 14 miles S. of Hunyad.

KLEPS, a town of Norway; 11 miles S. of Stavanger.

KLESÄKU, a town of Walachia; 21 miles W.S.W. of Bucharest.

KLETTGAU,

KLETTGAU, a landgrate of Germany, called also "The county of Sulz," situated near the Rhine as it leaves the lake of Constance.

KLEWAH, a town of Russian Poland, in Volhynia; 24 miles E.N.E. of Lucko.

KLIMATOVSKOI, a town of Russia, in the government of Novgorod; 44 miles W.N.W. of Novgorod.

KLIMATZSKOI, an island of Russia, in the lake of Onetzkoi; 48 miles N.N.E. of Petrovskifk.

KLIMIA, or CLIMIA, in the *Materia Medica*, the name given by the Arabian writers to the lapis calamarinis. Avicenna and Serapion never call it by any other name. Some pronounce the word *climia*. Hence the modern Greeks have formed their *climic*, which is the name of the same substance; and our calamarinis is evidently deduced from the same original.

KLIMOVA, in *Geography*, a town of Russia, in the government of Tobolsk, on the Tunguska; 200 miles E. of Eniseisk.—Also, a town of Russia, in the government of Tobolsk, on the Mura; 232 miles E.S.E. of Eniseisk.

KLIMOVIGI, or KLIMOVITICH, a town of Russia, and district of the government of Mogilev, or Mohilef, on the river Oteq, which falls into the Soff; 80 miles E. of Mogilev.

KLIN, a town of Russia, and district of the government of Moscow, on the river Seltra, falling into the Dubnia, which joins the Volga; 36 miles N.N.W. of Moscow.—Also, a small island in the N. Pacific ocean, near the E. coast of Kamtschatka.

KLINGENFEL, a town of the duchy of Carniola; nine miles S.W. of Landitrafs.

KLINGENTHAL, a town of Saxony, in the Vogtland, inhabited chiefly by miners and woodmen, driven out of Bohemia an account of their religion; 12 miles E. of Oelmitz.

KLINGERSKOI, a town of Russia, in the government of Irkutsk; 76 miles S.S.E. of Nerchinsk.

KLINGAN, a town of Switzerland, in the county of Baden; nine miles N. of Baden.

KLINGSTEIN, in *Mineralogy*, *Pierre Sonante*, Broch. Its colour is dark greenish-grey, passing into yellowish and ash-grey, a light olive-green or liver-brown. It occurs in mass. The cross fracture is almost dull, the longitudinal fracture is glistening. The former is splintery, passing into conchoidal, the latter is more or less flaty. It branches into indeterminate sharp-edged, sometimes tabular fragments. Usually translucent on the edges, considerably hard, and not easily frangible. When struck with a hammer, it gives a ringing metallic found, whence its name. Sp. gr. 2.57. It melts easily before the blow-pipe, and yields a clear, almost colourless glass. According to Klaproth's analysis, it consists of

Silex	57.25
Alumine	23.5
Lime	2.75
Oxyd of Iron	3.25
———— Manganese	0.25
———— Soda	8.1
———— Water	3.0
	98.1

Werner refers it to the floetz-trap formation, resting upon basalt, into which it frequently passes. It often contains crystals of feldspar, and then forms slate porphyry. Reufs reckons it to belong to the primitive rocks. It occurs in the middle mountains of Bohemia, particularly the Don-

nerberge, near Milbtschau, a conical mountain above 2500 feet high, which consists entirely of this mineral. It has also been observed by Jamieson in the island of-Landaf, in the Frith of Clyde. Very beautiful varieties of it also occur in rock masses between Llanberis and Caernarvon in North Wales. Aikin's Dict. of Chem. and Miner.

KLINKETS, in *Fortification*, a fort of small gates made through palisades, for sallies.

KLINKOSEE, in *Geography*, a town of Poland, in Podolia; 52 miles N.N.E. of Kamince.—Also, a river of Poland, which runs into the Dniester; eight miles S. of Kamince.

KLIP FISH, in *Icthyology*, a name by some authors supposed to mean the *lupus piscis*, or wolf-fish; and by others, the common cod-fish.

Of the former opinion is Fabricius, who supposes the *lupus* so called, because it is able to climb up rocks, or generally lies hid among rocks: the word *klip*, in the German, signifying a rock. Of the other is Schonefeldt, who supposes the cod has its name of klip-fish, or rock-fish, from its being usually dried upon the rocks.

KLIP-FISH is also a name by which the Dutch in the East Indies call a flat fish, caught frequently on those shores, and sometimes called also *soldaten visch*, or the soldier's fish. It somewhat resembles the bream in shape. Its general size is about six or seven inches in length, and it is of a very white and silvery hue. It differs very greatly, however, from the bream in many particulars. The nerves of its back fin are prickly, as in the perch; its tail is pointed, not forked; and the irises of its eyes are yellow. It is one of the finest fish of the East Indies. Its flesh is very firm, and falls into large pieces, when dressed, like that of the cod, and is very well tasted. See *CHAETODON teira*, *cornutus*, and *striatus*.

KLIPPE, in *Geography*, a small island in the Atlantic, near the coast of Africa. S. lat. 32° 10'.

KLOBUK, a town of Moravia, in the circle of Hradisch; 20 miles E. of Hradisch.

KLODAWA, a town of the duchy of Warsaw; 12 miles N.W. of Lencicz.

KLOETZEN, a town of Westphalia, in the principality of Lüneburg-Zelle; 45 miles E. of Zelle. N. lat. 52° 41'. E. long. 11° 8'.

KLOKLSBERG, a town of Bohemia, in the circle of Bechin; 12 miles S.E. of Rosenber.

KLOKOTZ, a town of Croatia; 24 miles S. of Carlstadt.

KLOPSTOCK, FREDERIC THEOPHILUS, in *Biography*, a German poet, was born at Quedlinburg in 1724. He was the eldest of eleven children, and distinguished himself in his youth among his companions in bodily and mental exercises. At the age of sixteen he went to college, and being placed under an able tutor, he made himself familiar with the languages, and acquired a taste for the beauties of the best classical authors. He made attempts in composition both in prose and verse. In the latter he wrote some pastorals, but not contented with these humbler efforts, he formed the resolution of composing an epic poem, and fixed upon the "Messiah" as his subject. In 1745, he went to the university of Jena, where he commenced the study of theology, but in the midst of his academical pursuits he was planning his projected work, and sketched out his three first cantos.

In 1746, he removed from Jena to Leipzig, and became a member of a society of young men who had formed themselves into a literary club for mutual improvement. About this time he exercised his genius in lyric compositions. Several of his odes, together with the three first cantos of his Messiah,

Messiah, appeared in a periodical paper, entitled "Bremen Contributions." The publication of ten books of his Messiah made his name known throughout Germany, and raised his reputation very high. This work was extremely popular among those who had hearts to feel the beauties of poetry and the warmth of devotion. The Messiah was quoted again and again from the pulpit by the younger divines, while those more advanced censured the fictions in which the poet had indulged himself on sacred topics, and rigid grammarians made severe strictures on the style and verification. He travelled into Switzerland in 1750, to pay a visit to Bodmer of Zurich, in consequence of an invitation, where he was received with every token of respect. The sublime scenery of that country, the simplicity of the inhabitants, and the freedom they enjoyed, were much suited to the taste of Klopstock. Here he intended to have spent the remainder of his life, but baron Bernstorff caused an invitation to be sent to him to reside at Copenhagen, with assurances of such a pension as would make him independent. Klopstock acceded to the proposal, and set out in 1751, by the way of Brunsviek and Hamburg, at which latter place he became acquainted with Miss Muller, a lady perfectly adapted to his own mind, whom he soon after married. They seemed by Providence destined to be one of the happiest couples upon earth, but he was soon deprived of her, for she died in childhood; her memory, however, was sacred to Klopstock to the last moment of his existence. He lived chiefly at Copenhagen, till the year 1771, after which he resided at Hamburg as Danish legate, and counsellor of the margrave of Baden, who gave him a pension. The latter part of his life was little varied by incidents, and after he had brought the Messiah to a conclusion, he continued to employ himself in composition, and in the correction and revision of his works. He died at Hamburg, in March 1803, being 79 years of age. By those who were intimate with him, he is represented as a truly amiable man, happy in a small circle of private friends, and particularly fond of the society of young persons. The character of Klopstock, as a poet, is that of exuberance of imagination and sentiment. His sublimity is almost unparalleled, he is apt to lose himself in mystical abstraction, and his excess of feeling sometimes betrays him into rant and extravagance. An able critic claims for the author of the Messiah a rank among the first poets. His odes and lyric poems have likewise been much admired by his countrymen, and his dramas display great force and dignity, but they are better adapted to the closet than the stage. To his talents as a prose writer, his "Grammatical Dialogues" will bear witness: they abound with judicious remarks, and the object of them is worthy of a true patriot, viz. an attempt to prove that the German tongue is capable of all the strength and nobleness of a classical language.

- KLOTEN, in *Geography*, a town of Switzerland, in the canton of Zurich; 5 miles N. of Zurich.

KLOTZ, CHRISTIAN ADOLPHUS, in *Biography*, an eminent German critic, was born in the year 1738 at Bifchofswerden, near Dresden, where his father was settled as a clergyman. He displayed, at an early period, such an attachment to letters, that his parents spared no expence to gratify his taste, and to enable him to cultivate his talents to the best advantage. He employed those leisure hours, which other lads devote to amusement, in composing and reciting German verses. At Gerlitz, he studied under Baumgarten the Greek and Roman classics, and gave a specimen of his powers in verification, by a poem composed on the "Destruction of Zittau," which was laid waste in the year 1757. In 1758, he proceeded to Leipzig to study

jurisprudence, and while here, he published several papers in the "Acta Eruditorum," and some separate pieces. In 1761, he published his "Opuscula Poetica," containing twenty-three odes, three satires, and as many elegies. From Leipzig he repaired to Jena, where he opened a school, which was well attended. Having accepted of an invitation to a professorship at the university of Gottingen in 1762, he set off for that place, and almost immediately after his arrival he was attacked by a severe illness, from which, however, he recovered, and immediately published a treatise, "De Verecundia Virgilii," to which were added three dissertations relative to the eclogues of the poet. He also published "Miscellanea Critica," and applied himself to the study of ancient gens and paintings, with which he became well acquainted. His celebrity had now increased so much, that he received two offers in the same day, one from the prince of Hesse Darmstadt, to be professor of the Oriental languages at Giessen, and the other from his Prussian majesty, to be professor of eloquence at Halle. While he was deliberating respecting the choice he should make, he was nominated by his Britanic majesty to be professor of philosophy at Gottingen, with an increased salary, which induced him to remain in that city, till some attempts were made to ruin his reputation. He then quitted Gottingen, and accepted an offer made him by his Prussian majesty, of being professor of philosophy and eloquence at Halle, with the rank and title of aulic counsellor. While preparing for his departure, he published "Historia Nummorum Contumeliosorum et Satyricorum," containing a history of these coins; and on his removal to Halle he gave the public another work of the same kind, and at the same time he effected, what had been often attempted before without success, the institution of a new society, called the "Literary Society of Halle," which afforded great satisfaction to the liberal-minded part of the learned in Germany. In 1766, he was invited by his Polish majesty to Warsaw to superintend the education of the children of the Polish nobility, which he would gladly have accepted, as it afforded him an opportunity of visiting new countries, but the king ordered him to remain at Halle, conferred upon him the rank of privy-counsellor, and accompanied this mark of honour with a considerable addition to his salary. He died in 1771, leaving behind him many other works besides those to which we have referred. Before his death, he revised every thing which he had written on coins, and published "Opuscula, nummaria quibus Juris Antiqui Historizque nonnulla Capita explicantur." Gen. Biog.

KLUMP-FISH, in *Ichthyology*. See TETRODON *Mola*.

KLYDAU, LILL, in *Geography*, a small island on the E. side of the gulf of Bothnia. N. lat. 60° 37'. E. long. 20° 54'.

KLYDAU, *Stor*, a small island on the E. side of the gulf of Bothnia. N. lat. 60° 39'. E. long. 20° 48'.

KLYSSA, a town of Prussia, in Pomerelia; 33 miles S.S.W. of Dantzic.

KMIDOMOUKA, a town of Poland, in the palatinate of Kiev; 32 miles S.E.E. of Bialacerkiev.

KNAG, a term used by country people for a knot in wood; also for the branches which grow out in the hart's horn, near the forehead.

KNAP'S BAY, in *Geography*, a bay in Hudson's bay. N. lat. 61° 15'. W. long. 94° 54'.

KNAPPIA, in *Botany*, so named by the writer of the present article, in honour of John Leonard Knapp, esq. F. L. S. and A. S. author of "Gramina Britannica, or Representations of the British Grasses, with Remarks and occasional Descriptions," an elaborate work in quarto, with

119 coloured plates, drawn by the author, published in 1804.—Sm. Fl. Brit. 1387. Engl. Bot. v. 16. 1127. (Chamaeropsis; Schrad. Germ. v. 1. 158.)—Clafs and order, *Triandra Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Glume of two erect, equal, oblong, abrupt, keeled valves, without awns, containing a fingle floret. *Cor.* the length of the calyx, ovate, obtufe, clofed, confifting of innumerable, fimple or branched, parallel fibres, denfely matted together, united at their bafe, without awns. *Stam.* Filaments three, capillary, twice as long as the corolla; anthers of two elliptical pointed lobes, feparate at the bafe and fummit. *Pyl.* Germen fuperior, ovate, fmooth; ftyles two, very fhort; ftigmas very long, capillary, acute, downy. *Peric.* none, except the permanent corolla and calyx. *Seed* one, elliptical, unconnected with the glumes, but enveloped in them.

Efl. Ch. Calyx of two abrupt awnlefs valves, fingle-flowered. Corolla compofed of denfely-compacted fibres, clofed, permanent. Seed unconnected.

1. *K. agrostoides*. Engl. Bot. t. 1127. Knapp Gram. t. 110. Hull. ed. 2. 23. (Chamaeropsis minima; Schrad. Germ. 158. Agrostis minima; Linn. Sp. Pl. 93. Willd. Sp. Pl. v. 1. 372. Sm. Fl. Brit. 82. Hudf. 32. With. 134. Gramen minimum, paniculis elegantiffimis; Bauh. Theatr. 26. G. minimum, Anglo-Britannicum; Rai Syn. Indic. Pl. Dub. G. fpartuum, capillaceo folio minimum; Dill. Giff. 172. t. 16. excellent.)—A native of fandy paftures, efppecially near the fea, in various parts of Europe; as Germany, the fouth of France, and the fouth-weft coaft of Anglefea, at which laft place it has been obferved in plenty by the Rev. H. Davies. It is a fmall, delicate, annual grafs, flowering in the early fpring, after which it foon withers and difappears. The root confifts of a few long fimple fibres. *Stems* from one to three inches high, fimple, fender, ftraight, fmooth, naked, except at the bottom. *Leaves* almoft entirely radical, fhort, linear, channelled, blunt, with very broad fheathing membranous bafes. *Spike* fimple, terminal, hady an inch long, of eight or ten little purpifh or green flowers, placed alternately, each on a fhort ftalk, on a fender, zig-zag, common ftalk, to which, when in feed, they become clofely preffed.

The name of *Knappia* cannot be fuperfeded by *Chamaeropsis*, the latter being untenable, as compofed of another eftablifhed generic name *Agrostis*, and contrary to the rule of Linnæus, Phil. Bot. feft. 225, “a generic name, with one or two fyllables prefixed, fo as to make it apply to a totally different genus from what it originally designated, is to be rejected.” We cannot but wonder, therefore, that the excellent Schradler fhould have been led, by any of his lefs learned countrymen, to adopt fuch a name, when another was already before him, liable to no objection. S.

**KNAPSACK**, in *Military Language*, is a rough leather or canvas bag, which a foldier carries on his back, containing all his neceffaries. Square knapfacks are moft convenient, and fhould be made with a divifion to hold the fhoes, black-balls, and brushes, feparate from the linen. White goat-fkins are fometimes ufed. Soldiers are put under ftoppages for the payment of their knapfacks, which, after fix years, become their property.

**KNAPWEED**, in *Botany*. See *JACEA*.

**KNAPWEED**, a common name given to a kind of weed, which is fometimes called blue-bottle. It infests arable land greatly in many cafes.

**KNARED**, in *Geography*, a town of Sweden, in the province of Halland; 14 miles E.S.E. of Halmilad.

**KNARESBOROUGH**, a borough, market-town, and parifh in the wapentake of Claro, Weft-Riding of Yorkfhire,

England, is fituated on a rocky mountain, at the foot of which runs the river Nid. It is one of the ancient burghs that were part of the demefnes of the crown, found under the title of Terra Regia, in Domefday Book, and other records. The fite of Knarefborough correponds with the difcription given of the towns of the Britons; being placed on the bank of a river for the fupply of water, and on the firt of a foreft, for convenience of hunting and palture. The remains of a ditch and rampart, which may yet be traced, include an area of 900 feet in length, and 600 in breadth. Soon after the Norman conqueit, a ftrong caftle was built here by Serlo de Burgh, who accompanied the conqueror to England, and received this manor, with feveral others, as a reward for his fervices. The caftle, having fallen to the crown, was granted by Henry III. to his brother Richard, earl of Cornwall, in the year 1257. In 1327, it was taken by John de Lilburn, an officer belonging to the earl of Lancafter; but, being befieged by the king's order, and Lilburn finding no profpect of relief, he furrendered, having firft destroyed all the records, and every memorial of the liberties and privileges of the burgh. In 1371, the caftle and manor were granted by Edward III. to his fon, John of Gaunt, duke of Lancafter: from whofe time it has been an appendage to the duchy of Lancafter. The town and caftle had a confiderable fhare in the civil war of the 17th century: after a brave refiftance, the caftle furrendered to lord Fairfax; and was ordered by the houfe of commons to be rendered untenable. The walls and towers have ever fince been mouldering away. This caftle contained nearly two acres and a half within its walls, which were flanked with eleven towers: thefe, with feveral other buildings in the different wards, afforded accommodation for a numerous garrifon. Part of the principal tower is ftill remaining, and appears to have been built about the time of Edward III. It confifts of three ftories above the keep or dungeon. The firft room on the ground-floor has been, from time immemorial, the repository of the ancient records. On the fecond ftory is a ftate-room, called the king's-chamber, in which Richard II. was imprifoned after his depofition. Beneath this tower is the dungeon, to which there is a defcent by twelve fteps: the roof is arched with ftone, and fupported by one round pillar, nine feet in circumference. In a part of the ruins are the remains of a fecret cell, or hiding-place, conftructed in the middle of the wall: this receptacle is three feet four inches high, two feet eight inches wide, and more than twenty feet in length. In the caftle-yard is the entrance to an arched fubterraneous paffage leading to the moat. Leland, fpeaking of this caftle, fays, “It ftandeth magnificently and ftroglly on a rock, having a deep ditch hewn out of the rock, where it was not defended by the river Nid.”

The church of Knarefborough, dedicated to St. John the Baptift, was a grant from the crown at the beginning of the 12th century. On the north fide of the choir is a chapel belonging to the Slingby family: on an altar-tomb are whole length figures of fir Francis Slingby and his lady; the knight in complete armour; the lady in a long robe, with folding plaits down to the feet: here are alfo figures of fir William Slingby and Henry Slingby, efq. and various other monuments and infcriptions. On the fourth fide of the choir is a chapel belonging to the Plumpton of Plumpton, though no traces now remain of that ancient family, except their arms ftained on glafs in the window. The feat on either fide of the choir, and a pulpit facing the eaft window, appear to be ancient.

Knarefborough was fummoned to fend members to parliament in the firft year of queen Mary; from which

time it has returned two representatives: the right of election is vested in the holders of burgage tenures, 84 in number. In the diary of sir Henry Slingby, who was elected in 1640, is the following note:—"There is an evil custom at such elections, to bestow wine on all the town, which cost me sixteen pounds at least." The practice of purchasing the burgage-houses began about the year 1714; since which a majority of the votes have been in the possession of the dukes of Devonshire, who have nominated the two members. The town, though a borough, is not incorporated; but is governed only by a bailiff and constable. Here are a spacious market-place, and a neat market-cross, which was erected in the year 1710. Over the river is a good stone bridge. On the east side of the church is a free-school, endowed, in 1616, by the Rev. Robert Challoner, a native of Goldborough, and rector of Amerham, in Buckinghamshire. The present building was erected by subscription in 1741. In Windfor-lane is a Dissenters' chapel, founded by lady Hewley, of Bell-hall, near York; the present edifice was built, on the ancient site, in 1778. In Gracious-street is a Quaker's meeting-house, erected in 1701. A considerable manufacture of linen has been carried on here for many ages, and is still in a flourishing condition; upwards of 1000 pieces, each 20 yards in length, being often woven in a week. In the year 1764, an act of parliament was obtained for the better supply of river water, of which the conveyance before was, from the elevated situation of the town, rendered difficult and expensive. In the Long walk, close by the river Nid, is the *Dropping well*, or Petrifying spring, which issues from a lime-stone rock, about 40 yards from the bank of the river; and, after running about 20 yards, divides, and spreads itself over the top of a ledge of rock, whence it trickles or drops down from 30 or 40 places, into a channel hollowed for the purpose. The spring is supposed to send forth 20 gallons in a minute. This rock, which is about 10 yards high, 16 long, and from 10 to 16 broad, about the year 1704, started from the common bank, and left a chafin between them. Tradition states, that near this rock the famous Yorkshire fybil, Mother Shipton, was born, about the year 1488. From the Dropping well, the walk extends along the river side to the High-bridge; producing, as the river meanders very much, every 10 or 20 yards, a new point of view, which, though composed of the same objects, is surprisngly variegated. From some parts of this walk are seen the venerable ruins of the castle, the hermitage, &c. with an intermixture of rocks and trees, over which part of the tower of Knareborough church makes its appearance. On the other side of the river, at the foot of a perpendicular rock, is St. Robert's chapel, supposed to have been made, in the reign of king John, by a learned and pious hermit of that name. This chapel is hollowed out of the solid rock; its roof and altar are beautifully ornamented; at the entrance is the figure of a knight templar in the act of drawing his sword. Near Grimbald-bridge is a hermitage called St. Robert's cave, supposed to have been the dwelling of the hermit above-mentioned. This cave has been rendered remarkable by a circumstance, which, in the year 1758, led to the discovery of the murder of Daniel Clarke, committed 14 years before, by Eugene Aram, a school-master of this town, a man of extraordinary learning, who pleaded his own cause in the most able manner. He was, however, convicted and executed. About half a mile from St. Robert's chapel, stood the priory, founded by the great earl of Cornwall, about the year 1257, for a society of friars of the order of the Holy Trinity. The site, at the dissolution, was granted to the earl of

Shrewsbury. It soon after became the property of the Slingbys, in which family it has ever since remained. The chapel, priory, and other buildings, are now entirely demolished; the ruins lying scattered in "many a mouldering heap." The remains of the fish-ponds shew them to be of a singular construction, so that the water might be drawn off at pleasure. On the opposite bank of the river stands a high rock, called Grimbald-crag; from the top of which is a fine prospect of the subjacent vale, the river, Birkham-wood, and the lofty summit of Almas-cliff. On the side of the rock is a cavern, which, by its rude remains, appears to have been the residence of a hermit, of the name of Grimbald.

Knareborough is 17 miles distant from York, and 202 north of London. The population, as returned to parliament in the year 1800, was 3388, inhabiting 766 houses. A market is held on Wednesday, which is plentifully supplied with all kinds of provisions: the quantity of corn sold here weekly, is supposed to exceed that of any other market in the county. In the year 1708, queen Anne granted to the burgesse five annual fairs, with a court of Pie-poudre; a court held in fairs to redress disorders committed in them.

On the east side of the town is Hay-park, containing about 1200 acres, granted by the crown to an ancestor of the late lord Bingley; and afterwards in the possession of sir John Hewley, whose widow appropriated the rents to charitable uses.

Knareborough forest extends from east to west upwards of twenty miles, and in some places eight miles in breadth. By the Domesday survey, there were then only four townships in this forest; Birtwith, Fultou, Beckwith, Rollett. But in the year 1368, there appear to have been three principal towns and sixteen hamlets.

At a short distance from Knareborough is Bilton park, formerly in the possession of the Slingby family, afterwards in that of Stockdale for above an hundred years, from whom it passed by sale to the Watsons; John Farside Watson, esq. is the present possessor.

On a small elevation above the river Nid, stands Conyng-ham house, formerly called Coghill hall: which for several centuries belonged to the Coghill family; but was purchased of sir Thomas Coghill, bart. with 51 acres of land, by the counts of Conyng-ham in the year 1706. Hargrove's History of the Castle, Town, and Forest of Knareborough, 1798, 12mo.

KNAVE, an old appellation for a man servant, and so used in 14 Edw. III. stat. 1. cap. 3.

The word is formed from the Saxon *cnapa*, or Flemish *knape*, which signify the same.

KNAVE also signifies a male-child, or boy, in which sense *knave-child* has been frequently used in contradiction to a girl; and in this sense Wickliffe uses the word in his translation of Exod. i. 16. and other places of the Bible. In the old Saxon translation of Mat. viii. 6. "Puer meus jacet in domo paralyticus," was termed *Myn knapa*.

KNAVE has sometimes also been used as an addition; as Willielmus Cowper de Denbigh, knave, &c.

It is a common opinion, that Rom. i. 1. was translated, *Paul, a knave of Jesus Christ*. This mistake was occasioned by a Bible in the duke of Lauderdale's library, where the word *knave*'s is inserted in lauders characters than the others, and a rasure might easily be discerned.

KNAVE-Line, in a Ship, a rope fastened to the cross-trees, under the main or fore-top, whence it comes down by the ties to the ram-head, and there it is reeved through a piece of wood of about two feet long, and so is brought to the ship's side, and there hauled up taugt to the rails.

**KNAUTIA**, in *Botany*, received its appellation in honour of two botanists, Christopher Knaut, the father, and Christian Knaut, the son, who lived at Halle, in Saxony, about the end of the 17th, and beginning of the 18th centuries, and who distinguished themselves by some paradoxical opinions respecting the methodical arrangement of plants. The method of the former is an alteration of that of Ray, without any improvement.—The latter was absurd enough to suppose that the essence of a flower consisted in its corolla.—Linn. Gen. 49. Schreb. 65. Willd. Sp. Pl. v. 1. 561. Mart. Mill. Dict. v. 3. Sm. Prod. Fl. Græc. p. 1. 85. Ait. Hort. Kew. ed. 2. v. 1. 231. Juss. 195. Lamarck Dict. v. 3. 367. Illustr. t. 58. Gartn. t. 86.—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Aggregate*, Linn. *Dipsacæ*, Juss.

Gen. Ch. *Cal.* Common perianth, containing the florets disposed in a simple orb, cylindrical, oblong, erect, divided into as many segments as there are florets; proper perianth very small, crowning the germen. *Cor.* universal, equal; proper of one petal, unequal; tube the length of the calyx; limb unequal, in four segments, of which the outer one is larger and ovate. *Stam.* Filaments four, longer than the tube of the corolla, inserted into the receptacle; anthers oblong, incumbent. *Pist.* Germen inferior; style thread-shaped, as long as the stamens; stigma thickish, bifid. *Peric.* none. *Seds.* solitary, square with a woolly tip. *Recept.* common, very small, flat, naked.

Obf. This genus is distinguished from *Scabiosa* in having a tubulated calyx, and the florets arranged in a simple orb.

Elf. Ch. Common calyx oblong, simple, containing about five flowers; proper calyx simple, superior. Florets irregular. Receptacle naked.

1. *K. orientalis*. Linn. Sp. Pl. 146. Till. Pis. t. 48.—“Leaves cut. Florets five, longer than the calyx.”—A native of the Levant, flowering from June to September, and frequently to be seen in our gardens. *Root* annual. *Stem* branched, about four feet high. *Branches* terminated by single peduncles, each supporting a flower. *Florets* of a bright-red colour. *Leaves* on the middle of the stem pinnated; the rest are serrated. *Seds.* compressed, hairy, many-toothed at top. *Down* a concave crown, with many bristle-shaped, unequal teeth.

2. *K. propretica*. Linn. Sp. Pl. 1666. Willd. n. 2. (*Scabiosa orientalis villosa*, flore flavescentibus; fructu pulchro oblongo; Tourn. Cor. 35.)—“Upper leaves lanceolate, entire. Florets ten, equal with the calyx.”—A native of the East, from whence Forskall sent seeds of it to Linnaeus, who raised plants from them in his garden, from one of which he made the following description.—“*Stem* biennial, the thickness of a finger, two feet in height, villous, resembling *Chirantus incanus*. *Leaves* roughish, serrated; the upper ones a span long. *Calyx* oblong, cylindrical, composed of eight or ten leaves, awl-shaped at the point. *Corolla* four-cleft, purplish; anthers of the same colour; filaments and pistils white. It differs from the last species in having the upper leaves undivided; florets about ten, instead of five, whilst the seed-crown is fifteen-toothed and fringed.”—It appears to us, nevertheless, to be a mere variety.

*K. palestina* and *plumosa* of Linnaeus are referred by Dr. Smith, in his *Prodromus Floræ Græcæ*, to the genus *Scabiosa*, to which they most indubitably belong.

**KNAUTIA**, in *Gardening*, contains plants of the herbaceous, annual, and biennial kinds; of which the species cultivated are, the oriental knautia (*K. orientalis*); and the Levant knautia (*K. propretica*).

*Method of Culture.*—Plants of this kind may be easily increased by seeds, which, when permitted to scatter in the

autumnal season, produce good plants. After they this may be taken up, and planted out in the clumps and borders of pleasure-grounds, among other low shrubs near the walks. In this way the plants live through the winter, and flower in June. There is no particular sort of culture requisite afterwards, but to keep the plants perfectly clean from weeds. The seeds fall to the ground as soon as they become fully ripe.

These plants are capable of affording variety among other hardy flowering plants which are of similar growths.

**KNAWEL**, in *Botany*, said to be a word of German origin, but of its signification Dillenius confesses himself, “though a German,” to be ignorant. He adopts it, in his *Novæ Plantarum Genera*, 94. t. 3, for what Linnaeus more happily called *Sceleranthus*, of which we shall treat in its place.

**KNECK**, in the *Sea Language*, the twisting of a rope or cable, as it is veering out.

**KNEE**, GENU, in *Anatomy*. See EXTREMITIES.

**KNEE**, *Preternatural Cartilaginous Substances in, in Surgery*. See JOINTS, *Diseases of*.

**KNEE**, *Dropsy of*. See JOINTS, *Diseases of*.

**KNEE**, *White Swelling of*. See WHITE SWELLING.

**KNEE**, *Dislocation of*. See LUXATION.

**KNEE-CAP**, a sort of bandage employed for keeping up a steady, equal, and effectual pressure on the knee, when the nature of the case requires such treatment, as for instance, when there are preternatural cartilaginous substances in the joint, and it is not judged proper to submit to the operation of excision. See JOINTS, *Diseases of*.

**KNEE-PAN**, in *Anatomy*. See EXTREMITIES.

**KNEE-PAN**, *Dislocations of, in Surgery*. See LUXATION.

**KNEE-PAN**, *Fractures of*. See FRACTURE.

**KNEE**, in the *Manège*, is the joint of the fore-quarters, that joins the fore-thigh to the flank.

**KNEES**, in a *Ship*, are the crooked parts of oak timber which secure the beams to the sides of the ship, and are distinguished by the terms hanging-knees and lodging-knees; the former are those whose arms lay to the side in a perpendicular direction, whereas the latter lay next the timber upon the clamps in the direction of the hang of the deck. The scarcity of those articles has compelled the ship-builder to introduce knees of iron; but being inferior in point of contact with the ship's sides, and as the bolts cannot be drove tight in the iron-knees if the ship strains, they consequently mult work loose, these, therefore, should only be reckoned as an inferior substitute.

**KNEE of the Head**, by sailors called the *cawwater*, an assemblage of pieces of oak timber, tabled or coaked together edgeways, upon account of its great breadth: it extends from the fore-part of the stern to the figure-head, which it supports, as likewise the rails and all other compartments of the head, and is secured to the bows by large knees, called cheeks of the head, and through the stern, &c. by bolting.

**KNEE Holm**, or **KNEE Holly**, in *Botany*. See *Ruscus aculeatus*.

**KNEE Lake**, in *Geography*, a lake of North America. N. lat. 55. W. long. 95.

**KNEELING**. See GENUFLEXION.

**KNEEP HEAD**, in *Geography*, a cape on the E. coast of the island of Lewis. N. lat. 58° 10'. W. long. 6° 9'.

**KNEKINIC**, a town of Aultrian Poland, in Galicia; 28 miles S.E. of Lemberg.

**KNELLER**, Sir GODFREY, *Baronet*, in *Biography*, a portrait painter, more liberally encouraged, more praised and paid than any other man who ever trod the same path

with the same portion of real power in the art of painting. A rapid pencil and a ready talent of taking likenesses were the foundation of his reputation; and a most fortunate ignorance of the art among the best informed even of the public, by whom he was employed, aided his progress. Not but that he was equal to the production of good works if he had been more carefully trained, and had lived amongst those who knew how to value works of art upon just principles; but he was amongst the most vain of mankind, and had no regard whatsoever for that posthumous fame which leads men to sacrifice present enjoyments to future glory. His motto was, "to live whilst he lived," and, consequently, to make money was a matter of greater moment with him than to make good pictures; and he succeeded fully; for although he lost 20,000*l.* by the South-sea speculation, he left, at his death, an estate of 2000*l.* a-year. His prices, whilst he painted here, were 15 guineas for a head; 20 if with one hand; 30 for a half, and 60 for a whole length.

He was born at Lubec about the year 1648. His father was surveyor-general of the mines, and inspector of count Mansfeld's revenues. At first Godfrey was destined for a military life, but painting was his passion. His father acquiesced in his wishes, and placed him under Bol, at Amsterdam. He had even some instructions from Rembrandt. He visited Italy in 1672, and remained some time at Venice, where he painted some of the first families, and amongst them the cardinal Bassadonna. It is probable that he here learnt that free, loose style of execution in which he delighted, but by no means excelled; with him it fell to negligence and clumsiness, particularly in his draperies, which sometimes his heads exhibit a perfect master of the pencil.

Kneller did not stay long in Italy, as in 1674, he came to England with his brother, John Zachary, who assisted him in painting, without intending to reside here; but being recommended to Mr. Banks, a Hamburg merchant, he painted him and his family. Mr. Vernon, secretary to the duke of Monmouth, saw them, and sat to Kneller; and persuaded the duke also to sit. His grace was delighted, and engaged the king his father to have his picture by the new artist, at a time when the duke of York had been promised the king's picture by Lely. Charles, unwilling to have double trouble, proposed that both artists should paint him at the same time. Lely, as the established artist, chose his light and station: Kneller took the next best he could, and performed his task with so much expedition and skill, that he had nearly finished his piece when Lely's was only dead-coloured. The circumstance gained Kneller great credit; and Lely obtained no less honour, for he had the candour to acknowledge and admire the abilities of his rival. This success fixed Kneller here, and the immense number of portraits he executed, prove the continuance of his reputation.

He was equally encouraged by Charles, James, and William; and had the honour of painting the portraits of ten sovereigns (*viz.* Charles II. James II. and his queen, William and Mary, Anne, George I. Louis XIV. the czar Peter the Great, and the emperor Charles VI.), which is more than can be said of any other painter. His best friend was William, for whom he painted the beauties of Hampton Court; and by whom he was knighted in 1692, and presented with a gold medal and chain worth 300*l.* In his reign, he also painted several of the admirals for Hampton Court, and the Kit-Cat club. He lived to paint George I. and was made a baronet by him. In 1722, sir Godfrey was seized with a violent fever, from the immediate danger of which he was rescued by Dr. Meade. He languished,

however, some time, and died in October 1723. His body lay in state, and was buried at his country-seat called Wilton; but a monument was erected to him in Westminster Abbey, for which he left 300*l.* and gave particular instructions for the execution of it to Rybrach.

During the latter part of his time, that is, after the death of Lely, in 1680, Kneller stood at the head of the professors of his art in this country, and that most conspicuously. It is not therefore surprising that he experienced the encouragement he did. He has left some few good pictures behind him as proofs of the natural powers he possessed; but his most sincere admirers, who are judges, must acknowledge that the far greater portion of those he allowed to pass into the world under his name, are a disgrace to him and his patrons. His picture of the converted Chinese at Windsor, he is said to be most proud of, as justly he might be. This, however, shews his profligacy in principle, as it exhibits that he really knew what was good, and could produce it if he chose. According to his own doctrine, he did as much and no more than was necessary to pass current among his employers. "History painters," he said, "make the dead live, and don't begin to live till they are dead. I paint the living, and they make me live."

There is a singular paucity of imagination in Kneller's pictures. He did indeed (and Walpole justly commends him for it) indulge in an ideal drapery for women, instead of the monstrous dresses they wore at the time; but his ingenuity does not appear equal to assist them so much; so that there is a ridiculous mixture of positive formality in the stiff neckcloths and wired skirts of coats of the one, and of an affected flow and grace in the loose robes of the other, which consist of nothing more than a chemise thrown open, and discovering the bosom, and a robe-de-chambre loosely drawn over it.

All that Kneller can be justly praised, or deservedly esteemed for, generally speaking, is, that his heads, or rather his faces, have a good deal of liveliness and gentility. It seldom amounts to character in the general run of his portraits. Now and then the master-hand appears, when the subject or the moment were favourable. There is, at Petworth, a head of sir Isaac Newton that would be an honour to any man to have produced; and portraits of branches of the Seymour family, which are a disgrace to the name they bear.

The artists who succeeded him, dazzled by his success, and allured by the professed admiration of his taste, most unaccountably lost sight of the infinitely greater beauties of Vandyke's manner, and followed his alone. In consequence, the art sunk to the lowest ebb, till it was somewhat redeemed by Richardson's writings, and Hudson's and Ramsay's talents in painting. But true taste was not restored till Reynolds took up the pencil; and now, happily, the weakness as well as the merits of Kneller are duly appreciated, and hundreds of his works consigned to the oblivion he probably wished they might experience. When the mass may be thus disposed of, and the select only remain, then he will obtain, unalloyed, the praise his talents, when carefully exerted, fully deserved.

**KNEMA**, in *Botany*, a genus named by Loureiro, is derived from *xman*, the *spoke of a wheel*, on account of the authors being disposed into a star-like, or wheel-shaped form.—Loureir. Cochinch. 604.—Clais and order, *Diacrya Monadelphica*. Nat. Ord. . . .

Gen. Ch. Male, *Cal.* none. *Cor.* of one petal, fleshy; tube thick, short; limb in three, acute, segments, woolly on the outside. *Stam.* a single filament, short, turbinate,

anthers to nr 12, ovate, two-celled, expanded horizontally about the top of the filament. Female, (flowers on a distinct plant.) *Cal.* Perianth inferior, very short, somewhat truncated, permanent. *Cor.* as in the male. *Pist.* Germen superior, roundish, hairy; style none; style lacinated, erect. *Peric.* Berry ovate, succulent. *Seed* solitary, ovate, tunicated.

*Eff. Ch.* Male, Calyx none. Corolla three cleft. Anthers formed into a star, about the filament. Female; Calyx rather truncated. Corolla three-cleft. Stigma one. Berry superior, single-seeded.

1. *K. corticofti.* Loureir.—A native of the woods of Cochinchina.—This is a large tree, with a thick brown, or reddish bark. Branches ascending. Leaves lanceolate, entire, smooth, alternate, on foot-stalks. Both male and female flowers nearly terminal, on many-flowered stalks. Corolla brown on the outside, yellowish red within. Berry small, pulpy, red.

It seems to us that Loureiro refers this genus to the order *Menandria* rather inadvertently, because he describes 10 or 12 anthers as pertaining to the generic character.

KNEVELS, in a *Ship.* See KEVELS.

KNIAGININ, in *Geography*, a town of Russia, in the government of Nizagorod, on a rivulet that falls into the Volga; 40 miles E.N.E. of Niznei Novgorod.

KNIASE, a town of Poland, in Volhynia; 50 miles S.W. of Lucko.

KNIFA, in *Botany*, one of Adanson's whimsical names, of whose origin or meaning no account is given. He uses it to designate a genus of his own, composed of the Linnean *Hypericum mutilum* and *setifolium*, whose flowers have but two styles, and their capsules two cells.

KNIFE is a well known instrument made for cutting, and adapted in form to the uses for which it is designed.

Knives are said to have been first made in England in 1563, by one Matthews, on Fleet-bridge, London. *Anderf. Hist. Com.* vol. i. p. 402.

Surgeons have various sorts of knives. See BISTOURY, &c.

KNIFVEN, in *Geography*, a small island on the W. side of the gulf of Bothnia. N. lat. 60° 38'. E. long. 17° 30'.

KNIGHT, EQUES, among the *Romans*, was the second degree of nobility; following immediately that of the senators.

At the time of building the city of Rome, the whole army of Romulus consisted of 3000 foot and 300 horse, which 300 horse were the original of the Roman equites or knights. These made the second order that had places in the senate.

Manutius and Sigonius are of opinion, that beside the equestrian order, and those knights immediately below the senators, Romulus instituted a military order, whereof the Roman cavalry was composed. But no ancient author takes notice of any order of knighthood instituted on purpose for the war, nor any other knights but those 300, which, as we have observed, were the first foundation of the equestrian order.

The knights had horses kept for them at the public charge; but when they were admitted among the senators, they resigned that privilege. To be a knight, it was necessary they should have a certain revenue, that their poverty might not disgrace the order; and when they failed of the prescribed revenue, they were expunged out of the lists of knights, and thrust down among the plebeians. Ten thousand crowns are computed to have been the revenue required.

The knights grew so very powerful, that they became a

balance between the power of the senate and the people. They neglected the exercises of war, and betook themselves principally to civil employments in Rome; inasmuch that Pliny observes, in his time, they had no longer a horse kept at the public expence.

Some say that the order of knights, as distinct from the people, did not begin before the time of the Gracchi; others say, the privilege was then first granted them, that no judge should be chosen, but out of their order; some time after which they admitted them into the senate. This, however, is certain, it was only from that time that a certain revenue was necessary, and that this entitled them to the knighthood, without being descended from ancient knights.

KNIGHT, in a more modern sense, properly signifies a person, who, for his virtue and martial prowess, is, by the king, raised above the rank of gentlemen, into a higher class of dignity and honour.

The word knight, in its original German, *knecht*, signifies a *servant*; and has since been used for a soldier or man of war. We have but one instance among us where knight is used in the first sense, and that is in *knight of the shire*, who properly serves in parliament for such a county. In the Latin, French, Spanish, Italian, and Dutch languages, knight is expressed by a word (*equites*) which properly signifies a *horseman*, as being usually employed on horseback. Indeed our common law calls them *milités*, *soldiers*, because they formed a part of the royal army, in virtue of their feudal tenures: one condition of which was, that every one who held a "knight's fee" immediately under the crown was obliged to be knighted; to serve the king as soldiers in his wars, in which sense the word *miles* was used *pro vassallo*; or fine for non-compliance.

The exertion of this prerogative, as an expedient to raise money, in the reign of Charles I., gave great offence, though warranted by law, and the recent example of queen Elizabeth; but it was by the statute 16 Car. I. c. 16. abolished: and this kind of knighthood has, since that time, fallen into great disregard.

Knighthood was the first degree of honour in the ancient armies, and was usually conferred with a great deal of ceremony on those who had distinguished themselves by some notable exploit in arms. They were originally said to be adopted, *adoptabantur in militum*, which we now call *dubbed*; as being supposed, in some measure, the sons of him who knighted them.

The custom of the ancient Germans was to give their young men a shield and a lance in the great council: this was equivalent to the "toga virilis" of the Romans. Before this, they were not permitted to bear arms, but were accounted as a part of the father's household; after it, as part of the community. (*Tacit. de Mor. Germ.* § 13.) Hence some derive the usage of knighting, which has prevailed all over the western world, since its reduction by colonies from those northern heroes. See KNIGHTHOOD, *Military, infra.*

The ceremonies at the creation of a knight have been various. The principal were a box on the ear, and a stroke with a sword on the shoulder. Then they put on him a shoulder-belt, gilt sword, spurs, and the other military accoutrements; after which, being armed as a knight, he was led in great pomp to the church.

The manner of making a knight with us, is described by Camden in a few words: "Qui equestrem dignitatem suscipit, flexis genibus leviter in humero percussitur: princeps his verbis Gallice affatur: *fus vel fois chevalier au nom de Dieu, surge vel sis eques in nomine Dei.*" This is meant

of knights-bachelors, which are the lowest, though the most ancient order of knighthood among us; for we have an instance of king Alfred's conferring this order on his son Athelstan. Will Malmb. lib. ii.

Knights grew so very numerous, that the dignity became of much less repute. Charles V. is said to have made five hundred in a single day: on which account, therefore, new orders of knighthood were instituted, in order to distinguish the more deserving from the crowd. For the several kinds of knights among us, see BACHELOR, BANNERET, BARONET, BATH, GARTER, &c.

KNIGHT is also understood of a person admitted into any order either purely military, or military and religious, instituted by some king or prince, with certain marks and tokens of honour and distinction.

Such are the *knights of the Garter, of the Elephant, of the Holy Gbosh, of Malta, &c.* All which see under GARTER, ELEPHANT, &c.

KNIGHT *Marshall.* See MARSHALL.

KNIGHTS of *St. Ampulla.* See AMPULLA.

KNIGHTS of *Annunciata.* See ANNUNCIATA.

KNIGHTS of *St. Anthony.* See ANTHONY.

KNIGHTS of *St. Bridget.* See BRICIANI.

KNIGHTS of *St. Calbarine of Mount Sinai.* See CATHARINE.

KNIGHTS of *the Chapel.* See CHAPEL.

KNIGHTS of *Christ.* See CHRIST.

KNIGHTS of *the Collar.* See COLLAR.

KNIGHTS of *the Dragon.* See DRAGON.

KNIGHTS of *the Elephant.* See ELEPHANT.

KNIGHTS of *the Ermin.* See ERMIN.

KNIGHTS-ERRANT, a pretended order of chivalry, whereof ample mention is made in the old romances.

They were a kind of heroes, who travelled the world in search of adventures, redressing wrongs, rescuing damsels, and taking all occasions of signaling their prowess. This romantic bravery of the old knights was heretofore the chimerica of the Spaniards; amongst whom there was no cavalier but had his mistress, whose esteem he was to gain by some heroic action. The duke of Alva, notwithstanding his age and gravity, is said to have vowed the conquest of Portugal to a young lady.

KNIGHTS of *St. George.* See GEORGE.

KNIGHTS of *Hospitallers.* See HOSPITALERS and MALTA.

KNIGHTS of *St. Louis.* See LOUIS.

KNIGHTS of *Malta.* See MALTA.

KNIGHTS of *St. Mark.* See ST. MARK.

KNIGHTS of *Mary.* See MARY.

KNIGHTS of *the Mine.* See MINE.

KNIGHTS of *Mount Carmel.* See CARMEL.

KNIGHTS, *Rad.* See RAD.

KNIGHTS of *the Round Table.* See TABLE.

KNIGHTS of *the Temple.* See TEMPLARS.

KNIGHTS *Teutonic.* See TEUTONIC.

KNIGHTS of *the Thistle.* See THISTLE.

KNIGHTS of *the Shire, or KNIGHTS of Parliament,* are two gentlemen of worth, chosen on the king's writ in pleno comitatu, by such of the freeholders of every county as have the value of 40s. *per ann.* within the county, clear of all taxes and deductions except parliamentary and parochial taxes, to represent such county in parliament.

This qualification of electors for knights of the shire or county members, is settled by stat. 8 Hen. VI. c. 7. and 10 Hen. VI. c. 2. amended by 14 Geo. III. c. 58. According to the estimate of bishop Fleetwood in his "Chronicon Preciosum," 40s. in the reign of Henry VI. was equal to 32*l.* *per annum* in the reign of queen Anne; and as the value

of money has been lowered since, judge Blackstone concludes that 1*l.* in the bishop's days must have been equivalent to 20*l.* in his own time; and the depreciation of money in later times must have made the difference much greater. (See DE-EX-PENSIS.) The other qualifications of the electors for counties in England and Wales, collected from statutes are; that no person under twenty-one years of age shall be capable of voting; nor any person convicted of perjury or subornation of perjury; that no person shall vote in right of any freehold granted to him fraudulently to qualify him to vote: that every voter shall have been in the actual possession or receipt of the profits of his freehold to his own use for twelve calendar months before, except it came to him by descent, marriage, marriage settlement, will, or promotion to a benefice or office: that no person shall vote in respect of an annuity or rent-charge, unless registered with the clerk of the peace twelve calendar months before: that in mortgaged or trust estates, the person in possession shall have the vote: that only one person shall be admitted to vote for any one house or tenement, to prevent the splitting of freeholds: that no estate shall qualify a voter, unless the estate has been assessed to some land-tax aid, at least twelve months before the election: and that no tenant by copy of court-roll shall be permitted to vote as a freeholder. (7 and 8 W. III. c. 25. 10 Ann. c. 23. 2 G. II. c. 21. 10 G. II. c. 18. 31 G. II. c. 14. 3 G. III. c. 24.) By statute 22 G. III. c. 41. no commissioner, or officer, employed in managing the duties of excise, customs, stamps, salt, windows or houses, or revenue of the post-office, shall be capable of voting in the election of a member of parliament.

These knights, when every man who had a knight's-fee was customarily constrained to be a knight, were of necessity to be *militēs gladio cincti*, for so the writ runs to this day; but now custom admits esquires to be chosen to this office.

It is required by 23 Hen. VI. c. 15. that all knights of the shire shall be actual knights, or such notable esquires and gentlemen as have estates sufficient to be knights; and by no means of the degree of women; and more precisely by 9 Ann. c. 5. that every knight of the shire shall have a clear estate of freehold or copyhold to the value of 600*l.* *per annum*, except the eldest sons of peers and of persons qualified to be knights of shires. For other qualifications, see PARLIAMENT.

The expences of knights of the shire, are to be defrayed by the county, during their sitting in parliament, at the rate of four shillings a day. This rate of wages was established in the reign of Edw. III. (See also 35 Hen. VIII. c. 11.) It is hardly necessary to add, that these are never now required.

KNIGHT'S *Cross, in Botany.* See CAMPION.

KNIGHT-HEADS, or *Bollard Timbers,* are oak timbers with large upper parts or heads, which are fayed and bolted together, one on each side the stern, or with a filling between, as they must open at the heads sufficient to admit the bowsprit between them, and running high enough to support the same above the stern.

KNIGHTS *Fee,* an ancient *law-term*, signifying so much land of inheritance as was esteemed sufficient to maintain a knight with suitable retinue; which, in the days of H. III., was reckoned at 15*l.* *per ann.* And by stat. 1 Edw. II. such as had 20*l.* *per ann.* in fee, or for life, might be compelled to be knights. But this statute is repealed by 16 Car. I. Sir T. Smith rates a knight's fee at 40*l.* yearly. According to Coke, a knight's fee contained twelve carucates, or plough-lands. Stow says, that there were found in England, at the time of the Conqueror, 60,211 knight's fees; according

ording to others there were 60,215; where of the religious houses, before their suppression, were possessed of 28,015. See FEE.

In consequence of the introduction of the feudal system upon the Norman conquest, all the lands in the kingdom were divided into knight's fees, in number, as Stow says, above 60,000; and for every knight's fee, a knight or soldier, *miles*, was bound to attend the king in his wars, for 40 days in a year; in which space of time, before war was reduced to a truce, the campaign was generally finished, and a kingdom either conquered or victorious. By this means, the king had, without any expence, an army of 60,000 men always ready at his command. Accordingly we find among the laws of William the Conqueror, one, (c. 58.) which in the king's name commands, and firmly enjoins, the personal attendance of all knights and others; "quod habeant et teneant se semper in armis et equis, ut decet et oportet: et quod semper sint prompti et parati ad servitium suum integrum nobis exultandum et peragendum, cum opus adfuerit secundum quod debent de feodis et tenementis suis de jure nobis facere." This personal service in time degenerated into pecuniary commutations or aids, and at last the military part of the feudal system was abolished at the restoration, by stat. 12 Car. II. c. 24.

**KNIGHTS SERVICE, *servitium militare***, a tenure whereby several lands in this nation were anciently held of the king. This was the first, most universal, and esteemed the most honourable species of tenure, called in Latin "*servitium militare*," and in law-French "*chivalry*" or "*service de chevalier*," answering to the "*sief d'haubert*" of the Normans; a name that frequently occurs in the Mirror. It differed in few respects from a pure and proper feud, being entirely military, and the genuine effect of the feudal establishment in England. In order to make this tenure, a quantity of land, called a knight's fee "*feudum militare*," was necessary; and he who held this proportion of land (or a whole fee) by knight-service, was bound to attend his lord to the wars for 40 days in every year, if called for; and this attendance was his "*reditus*" or return, his rent or service for the land he claimed to hold. If he held only half a knight's fee, he was only bound to attend 20 days, and so in proportion. This tenure had all the marks of a strict and regular feud; it was granted by words of pure donation, *dedi et concessi* (Co. Litt. 9.); was transferred by investiture or delivering corporal possession of the land, usually called livery of seisin; and was perfected by homage and fealty. It also drew after it these seven fruits and consequences, as inseparably incident to the tenure in chivalry; *viz.* aids, relief, primer seisin, wardship, marriage, fines for alienation, and escheat; which see respectively. It was by this tenure of knight-service that the greatest part of the lands in this kingdom was holden, and that principally of the king *in capite*, till the middle of the 17th century; and which was created, as Sir Edward Coke expressly testifies (4 Inst. 192.), for a military purpose; *viz.* for defence of the realm by the king's own principal subjects, which was judged to be much better than to hirelings or foreigners. The description above given relates to knight-service proper; which was to attend the king in his wars. There were also some other species of knight-service; so called, though improperly, because the service or render was of a free and honourable nature, and equally uncertain as to the time of rendering it, as that of knight service proper, and because they were attended with similar points and consequences. Such was the tenure by *grand serjeanty*, which see; and of this tenure that by *avowage* (which fee) was a species.

**KNIGHT'S Canal**, in *Geography*, an inlet of the Paci-

fic ocean, on the W. coast of North America, extending in an E. and N.E. direction about 50 miles. Its entrance from an arm of the sea lies in N. lat. 50° 45'. E. long. 233° 16'.

**KNIGHT'S Island**, a small island in Beering's bay, N.W. of Eleanor's sound, separated from the American continent by a narrow channel, which is navigable. N. lat. 59° 45'. E. long. 220° 47'.—Also, an island in Prince William's sound, about 30 miles in length from N. to S., and from two to five broad. N. lat. 60° 24'. E. long. 212° 52'.—Also, a small island in Hudson's bay. N. lat. 61° 50'. W. long. 93° 30'.—Also, an island in the Pacific ocean, and the largest of those called by Capt. Vancouver the "Snares;" discovered by Broughton, commander of the Chatham under Vancouver, in November 1791. Some parts of the island presented a very barren appearance, not unlike the W. side of Portland, composed of whitish rocky cliffs. The rocky islets are five in number, some of which are of a pyramidal form. It did not appear to be inhabited. The fourth point is situated in S. lat. 48° 15'. E. long. 166° 44'.

**KNIGHTS, *Poor***, a group of small islands, so called by Lieutenant Cook, who discovered them in November 1770, on the coast of New Zealand, when he was in S. lat. 36° 36'; at the distance of three leagues N.E. by N.

**KNIGHTEN-GILD**, in our *Old Writers*, a gold or company in London, consisting of nineteen knights, which King Edgar founded, giving them a portion of void ground lying within the walls of the city, now called Portokenward.

**KNIGHTHOOD**, a military order, or honour; or a mark or degree of ancient nobility, or reward of personal virtue and merit.

There are four kinds of knighthood; *military, regular, honorary, and social*.

**KNIGHTHOOD, *Military***, is that of the ancient knights, who acquired it by high feats of arms.

These are called *knights*, in ancient charters and titles, by which they were distinguished from mere *bachelors*, &c. These knights were girt with a sword, and a pair of gilt spurs; whence they were called *equites aurati*.

Knighthood is not hereditary, but acquired. It does not come into the world with a man like nobility; nor can it be revoked. The sons of kings, and kings themselves, with all other sovereigns, heretofore had knighthood conferred on them as a mark of honour. They were usually knighted at their baptism or marriage, at their coronation, before or after a battle, &c.

Between the age of Charlemagne and that of the Crusades, the service of the infantry was degraded to the Plebeians; the cavalry formed the strength of the armies, and the honourable name of *miles*, or soldier, was confined to the gentlemen who served on horseback, and were invested with the character of knighthood. The dukes and counts, who had usurped the rights of sovereignty, divided the provinces among their faithful barons; the barons distributed among their vassals the fiefs or benefices of their jurisdiction; and these military tenants, the peers of each order, and of their lord, composed the noble or equestrian order, which disdain to conceive the peasant or burgher as of the same species with themselves. The dignity of their birth was preferred by pure and equal alliances; their sons alone, who could produce four quarters or lines of ancestry, without spot or reproach, might legally pretend to the honour of knighthood; but a valiant plebeian was sometimes enriched and enroled by the sword, and became the father of a new race. A simple knight could impart, according to his judgment, the character which he received; and the warlike sovereigns of Europe

rope derived more glory from this personal distinction than from the lustre of their diadem. This ceremony, of which some traces may be found in Tacitus and the woods of Germany, was, in its origin, simple and profane: the candidate, after some previous trial, was invested with the sword and spurs; and his cheek or shoulder was touched with a slight blow, as an emblem of the last affront, which it was lawful for him to endure. But superstition mingled in every public and private action of life; in the holy wars, it sanctified the profession of arms; and the order of chivalry was assimilated in its rights and privileges to the sacred orders of priesthood. The bath and white garment of the novice were an indecent copy of the regeneration of baptism; his sword, which he offered on the altar, was blessed by the ministers of religion; his solemn reception was preceded by fasts and vigils; and he was created a knight in the name of God, of St. George, and of St. Michael the archangel. He swore to accomplish the duties of his profession; and education, example, and the public opinion, were the inviolable guardians of his oath. As the champion of God and the ladies ("I blush," says Gibbon, "to unite such discordant names"), he devoted himself to speak the truth; to maintain the right; to protect the distressed; to practise *courtesy*, a virtue less familiar to the ancients; to pursue the infidels; to despise the allurements of ease and safety; and to vindicate in every perilous adventure the honour of his character. The abuse of the same spirit provoked the illiterate knight to disdain the acts of industry and peace; to esteem himself the sole judge and avenger of his own injuries; and proudly to neglect the laws of civil society and military discipline. Yet the benefits of this institution, to refine the temper of barbarians, and to infuse some principles of faith, justice, and humanity, were strongly felt, and have been often observed. The asperity of national prejudice was softened; and the community of religion and arms spread a similar colour and generous emulation over the face of Christendom. Abroad, in enterprise and pilgrimage, at home in martial exercise, the barriers of every country were perpetually associated; and impartial taste must prefer a Gothic tournament to the Olympic games of classic antiquity.

The lance was the proper and peculiar weapon of the knight; his horse was of a large and heavy breed; but this charger, till he was roused by the approaching danger, was usually led by an attendant, and he quietly rode a pad or palfrey of a more easy pace. His helmet and sword, his greaves and buckler, is needless to describe in this place; but at the period of the crusades the armour was less ponderous than in later times; and instead of a massy cuirass, his breast was defended by an hauberk or coat of mail. Each knight was attended to the field by his faithful squire, a youth of equal birth and similar hopes; he was followed by his archers and men at arms, and four, or five, or six soldiers, were computed as the furniture of a complete "lance." In the expeditions to the neighbouring kingdoms or the Holy Land, the duties of the feudal tenure no longer subsisted; the voluntary service of the knights and their followers was prompted by zeal or attachment, or purchased with rewards and promises; and the number of each squadron were measured by the power, the wealth, and the fame of each independent chieftain. They were distinguished by his banner, his armorial coat, and his cry of war; and the most ancient families of Europe must seek in these achievements the origin and proof of their nobility. Gibbon's Decl. and Fall of the Rom. Emp. vol. xi. For a further account of the character of the ancient knights and the beneficial effects of chivalry and the crusades: see the articles CHIVALRY and CROSSADES.

These services, both of chivalry and of grand-serjeanty, were all personal, and as to their quantity or duration uncertain. But personal attendance in knight-service being found inconvenient and troublesome, the tenants found means of compensating for it; first, by finding others to serve in their stead, and in process of time by making a pecuniary satisfaction to the lords in lieu of it. (See ESCUAGE.) When knight-service, or personal military duty degenerated into escuage, or pecuniary assignments, all the advantages (promised or real) of the foedal constitution were destroyed, and nothing but the hardships remained. These hardships, which were numerous and grievous, were from time to time palliated by successive acts of parliament, till at length the humanity of king James I. consented, (4 Inst. 202), in consideration of a proper equivalent, to abolish them all, upon a plan similar to that, which he had formed and began to put in execution, for removing the feodal grievance of heritable jurisdiction, in Scotland, which has since been pursued and effected by the statute 20 Geo. II. c. 43. By another statute of the same year (20 Geo. II. c. 50.) the tenure of "ward-holding" (equivalent to the knight-service of England) is for ever abolished in Scotland. At length the military tenures, with all their heavy appendages, (having during the usurpation been discontinued) were totally destroyed by the statute 12 Car. II. c. 24. Blackst. Com. b. ii. See TENURE.

KNIGHTHOOD, *Regular*, is applied to all military orders, which profess to wear some particular habit, to bear arms against the infidels, to succour and assist pilgrims in their passage to the Holy Land, and to serve in hospitals where they should be received; such were the knights Templars, and such still are the knights of Malta, &c.

KNIGHTHOOD, *Honorary*, is that which princes confer on other princes, and even on their own great ministers and favourites; such are the knights of the Garter, St. Michael, &c.

KNIGHTHOOD, *Social*, is that which is not fixed, nor confirmed by any formal institution, nor regulated by any lasting statutes; of which kind there have many orders been erected on occasion of factions, of tilts and tournaments, masquerades, and the like.

The abbot Bernardo Justiniiani, at the beginning of his history of knighthood, gives us a complete catalogue of the several orders: according to this computation, they are in number ninety-two. Favin has given us two volumes of them under the title of Theatre d'Honneur & de Chevalerie. Menenius has published *Deliciae Equestrum Ordinum*, and Andr. Mendo has written *De Ordinibus Militaribus*. Beloi has traced the original, and Geliot, in his *Armorial Index*, has given us their institutions.

To these may be added, Father Menestrier de la Chevalerie Ancienne & Moderne, Micheli's *Trefor Militaire*, Caramuel's *Theologia Regolare*, Miræus's *Origines Equestrum sive Militarum Ordinum*: but above all, Justiniiani's *Historie Chronologiche del' Origine de gl' Ordine Militari*, e di tutte le Religione Cavaleresche: the edition which is fullest, is that of Venice in 1692, in two vols. fol.

KNIGHTON, HENRY, in *Biography*, who flourished at the close of the 14th century under Richard II. is celebrated as an ancient chronicler. He was a canon-regular of Leicester abbey, and wrote a history of English affairs in five books, from the conquest to the year 1395. He wrote likewise an account of the deposition of Richard II. His works are printed with the ten English historians published by

by the learned Selden. He is reckoned an exact and faithful narrator of events within his own times.

**KNIGHTON**, or *Tref-y-clawdd*, in *Geography*, a market-town and parish in the hundred of Knighton, and county of Radnor, South Wales; is seated in a valley, through which the river Teme meanders at the distance of 17 miles W. of Ludlow, and 33 S. of Shrewsbury. The valley of Teme, in the vicinity of this town, is skirted by lofty hills, the sides of which are well clothed with wood and verdure. The town contains some good houses, ranged on the sides of streets, which in parts are steep. Here is a free grammar school. The church has rather a singular appearance, from its irregular form, detached tower, with strange spire. Knighton has a weekly market, and an annual fair; and contained, in the year 1800, 221 houses and 785 inhabitants.

On the western side of the town, is part of the noted boundary embankment called Offa's Dyke, which was formed in the year 760, and intended to be the line of demarcation between England and Wales. Harold made a law, that if any Welshman was found on the eastern side of this dyke, he should lose his right hand. See **PRESTEIGN**.

**KNIN**, a town of Bohemia, in the circle of Beraun, near which is a gold mine, 12 miles S. E. of Beraun. N. lat. 49° 49'. E. long. 14° 18'.—Also, a fortified town of Dalmatia, strengthened by a deep ditch, and situated on a narrow neck where the river Kerka is joined by another stream, called Butim-ſchiza. This is supposed to be the ancient castle called "Arduha," taken by Germanicus, 40 miles E. of Zara. N. lat. 43° 55'. E. long. 16° 55'.

**KNIP BAY**, a bay on the W. coast of the island of Curaçoa.

**KNIPHAUSEN**, a sea-port town of Germany, in the lordship of Jever, taking its name from an ancient castle, where the tribunal of justice is held; 5 miles E. S. E. of Jever. N. lat. 53° 20'. E. long. 8°.

**KNISFENEAX**, otherwise called *Killſſinons* or *Kiſſinons*, the name of a people, who are spread over a considerable extent in the centre of the northern part of America. We are indebted to Mr. Mackenzie (see Voyage from Montreal, &c. Introd. p. 91, &c.) for a particular account of these people. Their language is the same as that of the people who inhabit the coast of British America on the Atlantic, the Esquimaux excepted, and continues along the coast of Labrador, and the gulf and banks of St. Lawrence to Montreal. The line then follows the Utawas river to its source, and continues from thence nearly W. along the highlands, which divide the waters that fall into Lake Superior and Hudson's Bay. It then proceeds till it strikes the middle part of the river Winnipeg, following that water through the lake Winnipeg, to the discharge of the Saskatchewan into it; from thence it accompanies the latter to Fort George, when the line, striking by the head of the Beaver river to the Elk river, runs along its banks to its discharge in the lake of the Hills, from which it may be carried back E. to the isle à la Croix, and so on to Churchill, by the Mississippi. The whole of the tract between this line and Hudson's bay and straits, that of the Esquimaux in the latter excepted, may be said to be exclusively the country of the Knisfeneaux. Some of them, indeed, have penetrated farther W. and S. to the Red river, to the S. of lak. Winnipeg, and the S. branch of the Saskatchewan.

These people are of a moderate stature, well proportioned, with few examples of deformity, and very active. Their complexion is copper-coloured, and their hair black, in which they resemble all the natives of North America. It is cut in various forms, according to the fancy of the several

tribes, and by some it is left in the long, lank flow of nature. They very generally extract their beards, and both sexes manifest a disposition to pluck the hair from every part of the body and limbs. Their eyes are black, keen, and penetrating; their countenance is open and agreeable, and they are fond of decorating their persons. In the use of vermilion, to which they are much accustomed, they contrast it with their native blue, white, and brown earths, to which they frequently add charcoal. Their dresses is simple and commodious. It consists of tight leggins, reaching near the hip; a strip of cloth, or leather, called *Aſſian*, about a foot wide, and five feet long, whose ends are drawn inwards and hang behind and before, covering a belt tied round the waist for that purpose; a close vest or shirt reaching down to the former garment, and cinctured with a broad strip of parchment fastened with thongs behind; and a cap for the head, consisting of a piece of fur, or small skin, with the brist of the animal as a suspended ornament; a kind of robe is thrown occasionally over the whole of the dress, and serves both night and day. These articles, with the addition of shoes and mittens, constitute the variety of their apparel. The materials vary according to the season, and consist of dressed moose-skin, beaver prepared with the fur, or European woollens. The leather is neatly painted, and fancifully wrought in some parts with porcupine quills, and moose-deer hair; the shirts and leggins are also adorned with fringe and tassels; nor are the shoes and mittens without somewhat of appropriate decoration, and worked with a considerable degree of skill and taste. Their head-dresses are composed of the feathers of the swan, the eagle, and other birds. The teeth, horns, and claws of different animals are also the occasional ornaments of the head and neck. Their hair is always besmeared with grease. The making of every article of dress is a female occupation; and they pay particular attention to the appearance of the men, whilst they neglect no decoration of their own persons; and their faces are painted with more care than those of the women.

The female dress is formed of the same materials with those of the men, but they are differently made and arranged. Their shoes are commonly plain, and their leggins gathered below the knee. The coat, or body-covering, falls down to the middle of the leg, and is fastened over the shoulders with cords, a flap or cape turning down about eight inches, both before and behind, and agreeably ornamented with quill-work and fringe; the bottom is also fringed, and fancifully painted as high as the knee. Being loose, it is inclosed round the waist with a stiff belt, decorated with tassels, and fastened behind. The arms are covered to the wrist, with detached sleeves, sewed as far as the bend of the arm, from thence they are drawn up to the neck, and the corners of them fall down behind, as low as the waist. The cap, when a cap is used, consists of a quantity of leather or cloth, sewed at one end, by which means it is kept on the head, and, hanging down the back, is fastened to the belt as well as under the chin. The upper garment is a robe like that of the men. Their hair is divided on the crown, and tied behind, or sometimes fastened in large knots over the ears. They prefer European articles to their own commodities. Their ornaments, like those of savages in general, consist of bracelets, rings, and similar baubles. Some of the women tattoo three perpendicular lines, which are sometimes double: one from the centre of the chin to that of the under lip, and one parallel on either side to the corner of the mouth.

The Knisfeneaux women are the most comely of any seen by Mr. Mackenzie on the American continent: they are well proportioned, and the regularity of their features would

would be acknowledged by the more civilized people of Europe; and their complexion is less darkly tinged than that of those savages who have less cleanly habits. These people are in general subject to few disorders. The lues venerea, however, is common, and is cured by the use of simples, with the virtue of which they are well acquainted. They are also subject to fluxes, and pains in the breast. They are naturally mild and affable, as well as just in their dealings; they are generous and hospitable, and extremely good natured, when not inflamed by spirituous liquors; indulgent to their children to excess; the father takes pains in qualifying them for the operations of war and hunting, and the mother is equally attentive to the instruction of the daughters. Illegitimacy is only attached to those children who are born before their mothers have cohabited with any man by the title of husband. Chastity does not seem to be a virtue among them, nor is fidelity thought to be essential to the happiness of a wedded life. Sometimes, however, the infidelity of a wife is punished with the loss of her hair, nose, and perhaps life. A temporary interchange of wives is not uncommon; and the offer of their persons is considered as a necessary part of the hospitality due to strangers. When a man loses his wife, it is considered as a duty to marry her sister, if he has one; or he may have both, if he pleases, at the same time. Notwithstanding the amiable traits of their character, they are not free from vices, even of the most atrocious kind. They are addicted to incest and bestiality. When a young man marries, he lives with the father and mother of his wife, and is considered as a stranger, till after the birth of his first child; he then attaches himself more to them than to his own parents; and his wife gives him no other denomination than that of the father of her child.

The profession of the men is war and hunting: they also spear fish, but the management of the nets is committed to the women. The females are subordinate, like those of savages in other tribes; but their labour is alleviated by the contiguity of lakes and rivers, where they employ canoes. In winter, when the waters are frozen, they travel with sledges drawn by dogs. They are subject, however, to every kind of domestic drudgery: they dress the leather, make the clothes and shoes, weave the nets, collect wood, erect the huts, fetch water, and perform every culinary service; so that their life is an uninterrupted succession of toil and pain. Under the impulse of this feeling, they sometimes destroy their female children. By the use of simples they also procure abortion; and this they do without any material injury to their own health.

Their funeral rites commence with smoking, and terminate with a feast: the body is dressed in the best habiliments possessed by the deceased, or his relations, and is then deposited in a grave, lined with branches: some domestic utensils are placed in it, and a canopy erected over it. During the ceremony, they make great lamentations; and when the deceased person is very much regretted, the near relations cut off their hair, pierce the fleshy part of their arms and thighs with arrows, knives, &c. and blacken their faces with charcoal. If they have distinguished themselves in war, they are sometimes laid on a kind of scaffolding; and it is said, that women, as in the East, have sacrificed themselves to the manes of their husbands. The whole property of the deceased person is destroyed, and the relations take in exchange for the wearing apparel any rags that will cover their nakedness. The feast which is given on this occasion, and which in some cases is repeated annually, is accompanied with eulogiums on the deceased; and on the tomb are carved or painted the symbols of his tribe, which are taken from the different animals of the country.

These people have frequent feasts; and at stated periods, as in spring and autumn, they practise long and solemn ceremonies. Dogs, and particularly those that are fat and milk-white, are offered as sacrifices. They also make large offerings of their property, of whatever kind it be. These ceremonies are performed on the bank of a river or lake; and if any stranger, who is in want of any thing that is displayed as an offering, chance to pass by, he has a right to take it, upon replacing something of inferior value; but to take or touch any thing wantonly is considered as a sacrilegious act, and highly insulting to the great Master of life, to adopt their expression, who is the sacred object of their devotion. The scene of private sacrifice is the lodge of the person who prepares it, and it is conducted with a variety of ceremonies. He begins by spreading the contents of his medicine-bag, containing various articles, on a piece of new cloth or well-dressed moose-skin neatly painted. The principal of these articles is a kind of house-hold-god, which is a small carved image about eight inches long, and is an object of the most pious regard. The next article is his war-cap, decorated with the feathers and plumes of rare birds, beavers, eagle's claws, &c. From this is suspended a quill or feather for every enemy whom the owner of it has slain in battle. The remaining contents of the bag are a piece of Brazil tobacco, several roots and simples in repute for their medicinal qualities, and a pipe. After certain previous ceremonies, an assistant lights the pipe, and presents it to the officiating person, who, turning to the east, draws a few whiffs, which he blows to that point. He practises the same ceremony towards the other three quarters, with his eyes constantly directed upwards. After some other ceremonies performed with this pipe, he makes a speech, explaining the design of the attendants being called together, and concludes with an acknowledgment of past mercies, and a prayer for the continuance of them, from the Master of life. He then sits down, and the whole company declare their approbation and thanks by uttering the word *ho!* with an emphatic prolongation of the last letter. The Assistant or Michiniwais again takes up the pipe, and holds it to the mouth of the officiating person, who, after smoking three whiffs out of it, utters a short prayer, and then goes round with it in a course from east to west, to every person present; and thus the pipe is smoked out: when, after turning it three or four times round his head, he drops it downwards, and replaces it in its original situation. He then returns the company thanks for their attendance, and wishes them, as well as the whole tribe, health and long life. These smoking rites precede every matter of great importance, with more or less ceremony, but always with equal solemnity. The public feasts are conducted in a similar manner, but with some additional ceremony. At these several chiefs officiate, and the guests discourse upon public topics, repeat the heroic deeds of their forefathers, and excite the rising generation to follow their example. From these feasts the women and children are excluded; but the women, who are forbidden to enter the places sacred to these festivals, dance and sing around them, and sometimes beat time to the music within them; thus forming an agreeable contrast.

As to their divisions of time, the Knisteneaux compute the length of their journeys by the number of nights passed in performing them; and they divide the year by the succession of moons, the names of which are descriptive of the several seasons. These people are acquainted with the medicinal virtues of many herbs and simples, and apply the roots of plants and the bark of trees with success. But the conjurers, who monopolize the medical science, blend mystery with their art, and conceal their knowledge. Their materia

medica they administer in the form of purges and clysters; but the remedies and surgical operations are supposed to derive much of their effect from magic and incantation. A sharp flint serves them as a lancet for letting blood, as well as for scarification in bruises and swellings.

Among their various superstitions, they believe that the vapour which is seen to hover over moist and swampy places is the spirit of some person lately dead. They also fancy another spirit which appears in the shape of a man, upon the trees near the lodge of a person deceased, whose property has not been interred with him. He is represented as bearing a gun in his hand; and it is believed that he does not return to his rest, till the property that has been withheld from the grave has been sacrificed to it. Mr. Mackenzie has given examples (*ubi supra*) of the Kniteneaux and Algonquin languages, between which there is a considerable resemblance. See ALCONQUINS.

KNITTERFELDT, a town of the duchy of Stiria, on the river Muehr; 20 miles S.W. of Pruck. N. lat. 47° 14'. E. long. 14° 36'.

KNITTLE, in *Sea Language*, a small line, which is either plaited or twisted, and used for various purposes at sea; as to fasten the service in the cable, to reef the sails by the bottom, and to hang the hammocks between decks, &c.

KNITTLINGEN, in *Geography*, a town of Wurtemberg, the birth-place of Faust, one of the first printers; 22 miles S. of Heidelberg.

KNOCK-HEAD, a cape of Scotland, on the north coast of Banffshire; 3 miles W.N.W. of Banff.

KNOCKING MILL. See STAMPING.

KNOCKLADY, in *Geography*, a mountain in the northern part of the county of Antrim, Ireland; about two miles S. of Ballycastle.

KNOCKMELEDDOWN, a chain of mountains in Ireland, between the counties of Waterford and Tipperary, and extending into both. These are rated by Smith amongst the highest mountains in Ireland. On the summit of one of them, major Eccles, the electrician, was buried by his own desire.

KNOCKNAREA, a cape of Ireland, in Sligo bay; 6 miles W. from Sligo.

KNOCKTOPHER, a post-town of the county of Kilkenny, Ireland; 63 miles S.W. from Dublin.

KNOLL, a term used in many parts of the kingdom for the top of a small hill, or for the hill itself.

KNOLLES, RICHARD, in *Biography*, an English historian, a native of Northamptonshire, was entered at the university of Oxford about the year 1560. He was afterwards chosen master of the free-school at Sandwich, and proved his fitness for this post by publishing a compendium of Latin, Greek, and Hebrew grammar. In 1610 he published, in folio, "A History of the Turks," which had been the labour of twelve years, and was executed in a manner highly creditable to his reputation. It has passed through many editions; and continuations have been made to it, of which the best is that of Paul Rycart, consul at Smyrna. Mr. Knolles likewise wrote "A brief Discourse of the Greatness of the Turkish Empire." He died at Sandwich, in 1610.

KNOLLIS, FRANCIS, an English statesman, was born at Grays, in Oxfordshire; and after receiving an university education, he went to court, and became a zealous friend to the reformation, in the reign of Edward VI., at whose death he went abroad. On the accession of queen Elizabeth he returned, and was made privy counsellor, and vice chamberlain of the household. He was employed in several

important matters of state; was one of the commissioners who sat in judgment on Mary queen of Scots; was appointed treasurer of the royal household, and knight of the Garter. He died in 1596. Sir Francis wrote a treatise against the usurpations of papal bishops, printed after his death in 1608; and a general survey of the Isle of Wight, which has not been printed.

KNOLLS, in *Agriculture*, a provincial term used in some counties to signify turnips.

KNONAU, in *Geography*, a bailiwick of Switzerland, in the canton of Zurich.

KNOPPERS, a superior kind of *Gall-nuts*; which see.

KNORR à RUSSENROTH, CHRISTIAN, in *Biography*, a learned German orientalist, was born in the year 1636. He pursued his studies at various colleges, and then travelled for improvement into France, England, and Holland. The subjects which had engaged his attention were chemistry and the cabalistic art, of which he had been from his youth a great admirer. At Amsterdum he was introduced to the knowledge of the Oriental tongues, and Hebrew; and made such progress in his favourite studies, as to obtain the esteem and friendship of Lightfoot, More, and Van Helmont. By the latter of these learned men he was introduced to the count palatine of Sulzbach, who, in 1688, nominated him one of his privy council, and afterwards gave him the appointment of his chancellor. The duties of these offices did not divert him from his literary, chemical, and mystical pursuits. He translated, into the German language, sir Thomas Brown's "Inquiry into vulgar Errors," and various other pieces; but his reputation is chiefly founded on a work, entitled "Kabbala Denudata, seu Doctrina Hebræorum transcendentalis, et metaphysica, atque theologica, &c." in 3 vols. 4to. This work abounds in wild reveries, fanciful chimeras, and mystical absurdities; but it contains, at the same time, very learned and valuable researches relative to the philosophy of the Hebrews.

KNOTS, in *Gardening*, a term used to express the rudiments of the first branches of plants, as they grow up from the seed. Thus, in the melon, the two first leaves or seed-leaves are called the ears, and the branches that grow from them are called, according to the order of their growth, the first, second, and third knots. Mr. Quintiny's famous method of raising the best melons, depended principally on the cutting off every third knot of the plant as they grew up. Philof. Trans. N° 45.

In trees, the knot denotes that part from whence it shoots out branches, roots, or even fruit.

The wood is harder and closer in the knots than in any other part, but it is also more subject to split there.

The use of the knots of plants is to strengthen the stem: they serve also as sieves to filtrate, purify, and refine, the juice raised up for the nourishment of the plant.

KNOT, in *Military Language*, the wing or epaulette, commonly made of worsted, of a non-commissioned officer or corporal. When sergeants and corporals are sentenced to be reduced to the ranks, the knot is generally cut off by the drum-major, in the presence of the battalion, as a mark of infamy.

KNOT on board a Ship, is a large knob formed on the extremity of a rope, by untwisting the ends thereof, and interweaving them regularly amongst each other. Of this there are several sorts: the chief of which are the *wale knot*, which is so made with the lays of a rope, that it cannot slip, and serves for sheats, tacks, and stoppers; the *bow-line knot* is so firmly made, and fastened to the crenelles of the sails, that they must break, or the sails split, before it will slip; the *sheep-shank knot*, which serves to shorten a rope without cutting it, which may be presently loosened; the *diamond knot*,

knot, the *rose knot*, &c. The knots are generally used to fasten one rope to another, by means of a small cord attached to the neck of the knot, called the *laniard*, which is firmly tied about both ropes. They are also designed to prevent the end of a rope from sliding through an eye, which the knot is intended to confine in a particular situation.

**KNOT-BERRIES.** See **RASPBERRIES.**

**KNOT-GRASS**, in *Botany*. See **POLYGONUM.**

**KNOT-GRASS**, in *Rural Economy*, a common name often given to couch-grass. See **COUCH-GRASS.**

**KNOT-GRASS**, *Mountain*. See **WHYLOW-GRASS.**

**KNOTS of the Log-Line**, at sea, are the divisions of it. See **LOG.**

**KNOT** is also used for the intrigue of a romance, or dramatic piece; being that part where the persons are the most embarrassed, by a conjuncture of affairs, whose end it is not easy to foresee.

Aristotle, under this term, includes all the incidents of a tragedy, from its beginning to the place where it begins to unravel. The knot holds as long as the mind is kept suspended about the event. The knot ought always to last to the middle of the fifth act, otherwise the rest of the piece languishes.

**KNOT**, *Order of the*, was the name of a military order in the kingdom of Naples, instituted in 1352, by queen Jane I. on occasion of the peace established between her and the king of Hungary, by means of her marriage with Louis prince of Tarantum. It was so called because the knights wore for their badge a knot, like a true-lover's knot, embroidered on the breast of their coat in purple silk, intermixed with gold.

The order consisted of sixty knights. Clement VI. approved of this order, and gave it the rule of St. Basil: it chose St. Nicolas for its protector; but it dwindled away after the death of its foundress.

**KNOT**, in *Ornithology*, the name of an English bird of the snipe kind, not known among authors by any particular Latin name, unless it be the *calidrys nigra*, or black calidrys of Bellonius, which is doubtful from his description; and said to have obtained its English name from Canute, one of the Danish kings of this island, who was particularly fond of it: it is the *tringa Canutus* of Linnæus, which see.

**KNOT**, or *Boss*, in *Pointed Architecture*, the key stone of the groin, where all its springs or ribs meet together.

**KNOULTON LAKE**, in *Geography*, a lake of America, in the state of Vermont. N. lat. 44° 48'. W. long. 71° 50'.

**KNOUT**, or **KNOOT**, is the name of a punishment inflicted in Russia, with a kind of whip called *knout*, and made of a long strap of leather prepared for this purpose. This instrument is a hard thong, about the thickness of a crown piece, and  $\frac{3}{4}$  of an inch broad, and tied to a thick plaited whip, which is connected, by means of an iron ring, with a small piece of leather fastened to a short wooden handle. With this whip the executioners dextrously carry off a slip of skin from the neck to the bottom of the back laid bare to the waist, and repeating their blows, in a little while rend away all the skin off the back in parallel strips. In the common knout, the criminal receives the lashes suspended on the back of one of the executioners: but in the great knout, which is generally used on the same occasions as racking on the wheel in France, the criminal is raised into the air by means of a pulley fixed to the gallows, and a cord fastened to the two wrists tied together; a piece of wood is placed between his two legs also tied together; and another of a crucial form under his breast. Sometimes his hands are tied behind over his back, and when he is pulled up in this

position, his shoulders are dislocated. The executioners can make this punishment more or less cruel: and, it is said, are so dextrous, that when a criminal is condemned to die, they can make him expire at pleasure, either by one or several lashes.

**KNOWING**, *Principles and Rules of*. See **PRINCIPLE**, and **RULE.**

**KNOWLEDGE** may be considered either as an operation of the mind, or as the result of that operation. In the former sense, it denotes the clear perception of truth; and in the latter, it signifies the treasure of associated ideas, that are laid up in the mind, in consequence of clear perceptions; thus, mathematics, astronomy, ethics, history, &c. are branches of knowledge.

**KNOWLEDGE**, according to Mr. Locke, consists in the perception of the connection and agreement, or disagreement and repugnancy, of our ideas. See **IDEA.**

In this sense, knowledge stands opposed to ignorance.

To *know* that *white is not black*, is only to perceive that these two ideas do not agree. So, in knowing that the three angles of a triangle are equal to two right ones; what do we more than perceive, that equality to two right ones necessarily agrees to, and is inseparable from, the three angles of a triangle?

**KNOWLEDGE**, *Kinds of*. As to what relates to the agreement or disagreement of ideas, we may reduce the whole doctrine, and consequently the whole stock of our knowledge, to four heads. *viz.* *identity or diversity, relation, co-existence, and real existence.*

With respect to the *identity or diversity* of our ideas, we may observe, that it is the first act of the mind to perceive its own ideas; and, so far as it perceives them, to know what each is, and thereby to perceive their difference; that is, the one not to be the other: by this the mind clearly perceives each idea to agree with itself, and to be what it is; and all distinct ideas to disagree. This it does without any pains, or deduction, by its natural power of perception and distinction; and, for doing this, men of art have established certain general rules or principles; as that, *what is, is*; and that it is impossible for the same thing to be, and not to be. But no maxim can make a man know clearer, that round is not square, than the bare perception of the two ideas, which the mind, at first sight, perceives to disagree.

The next kind of agreement, or disagreement, the mind perceives, in any of its ideas, may be called *relative*, and is nothing but the perception of the relation between any two ideas, of what kind soever; that is, their agreement or disagreement, one with another, in the several ways, or respects, the mind takes of comparing them.

The third sort of agreement, or disagreement, to be found in our ideas, is *co-existence*, or *non-co-existence*, in the same subject; and this belongs particularly to substances. Thus when we pronounce concerning gold, that it is fixed, it amounts to no more but this, that fixedness, or a power to remain in the fire unconsumed, is an idea which always accompanies that particular sort of yellowness, weight, fusibility, &c. which make our complex idea signified by the word *gold*.

The fourth sort is that of *actual and real existence*, agreeing to any idea.

Within these four sorts of agreement, or disagreement, seems contained all the knowledge we have, indeed all we are capable of; for all that we know, or can affirm, concerning any idea, is, that it is, or is not, the same with some other; as, that blue is not yellow: that it does, or does not, co-exist with another in the same subject; as, that iron is susceptible of magnetical impressions: that it hath that or

this relation to some other ideas; as, that two triangles upon equal bases, between the same parallels, are equal; or, that it has a real existence without the mind; as, that God is.

The mind becomes possessed of truth in several manners, which constitute so many different species of knowledge. Thus, when the mind has a present view of the agreement or disagreement of any of its ideas, or of the relation they have one with another, it is called *actual* knowledge.

Secondly, a man is said to know any proposition, when, having once evidently perceived the agreement or disagreement of the ideas whereof it consists, and so lodged it in his memory, that whenever it comes to be reflected on again, the mind assents to it without doubt or hesitation, and is certain of the truth of it: this may be called *habitual* knowledge. And thus a man may be said to know all those truths which are lodged in his memory, by a foregoing, clear, and full perception.

Of *habitual* knowledge, there are two sorts: the one consists of such truths, laid up in the memory, as, whenever they occur to the mind, it actually perceives the relation that is between their ideas; and this is in all those truths where the ideas themselves, by an immediate view, discover their agreement or disagreement one with another. The other is of such truths, whereof the mind having been convinced, it retains the memory of the conviction, without the proofs. Thus a man that remembers certainly, that he once perceived the demonstration, that the three angles of a triangle are equal to two right ones, knows it to be true, when that demonstration is gone out of his mind, and cannot possibly be recollected; but he knows it in a different way from what he did before: namely, not by the intervention of those intermediate ideas; whereby the agreement, or disagreement, of those in the proposition was at first perceived; but by remembering, that is, knowing, that he was once certain of the truth of this proposition, that the three angles of a triangle are equal to two right ones,—the immutability of the same relation between the same immutable things, is now the idea that shews him, that if the three angles of a triangle were once equal to two right ones, they will always be so. And hence he comes to be certain, that what was once true, is always true; what ideas once agreed, will always agree; and consequently, what he once knew to be true, he will always know to be true, as long as he can remember that he once knew it.

KNOWLEDGE also may be usefully distinguished into three kinds; *historical*, *philosophical*, and *mathematical*.

KNOWLEDGE, *Historical*, is merely the knowledge of facts, or of what is or happens in the material world, or within our own minds. Thus, that the sun rises and sets, that trees bud in the spring, that we remember, will, &c. are instances of historical knowledge.

KNOWLEDGE, *Philosophical*, is the knowledge of the reasons of things, or of what is or happens. Thus he has a philosophical knowledge of the motion of rivers, who can explain how it arises from the declivity of the bottom, and from the pressure which the lower part of the water sustains from the upper. So likewise the shewing how, and by what reason, desire or appetite arises from the perception or imagination of its object, would be philosophical knowledge.

KNOWLEDGE, *Mathematical*, is the knowledge of the quantity of things, that is, of their proportions or ratios to some given measure. Thus he who knows the proportion of the meridian heat of the sun at the summer solstice to its meridian heat at the winter solstice, might so far be said to have a mathematical knowledge of the sun's heat. So likewise he has a mathematical knowledge of the motion of a planet in its orbit, who can distinctly shew how, from the

quantity of the impressed and centripetal force, the velocity of the planet is produced; and how, from the action of the double force, the elliptical figure of the orbit arises.

These three kinds of knowledge differ evidently, it being one thing to know that a thing is; another, the reason why it is; and a third, to know its quantity or measure.

It is also evident, that *historical* knowledge, though extensively useful, and the foundation of the rest, is the lowest degree of human knowledge. Those who aim at the greatest certainty ought to join mathematical with philosophical knowledge. Nothing can more evidently shew that an effect arises from a certain cause, than the knowledge that the quantity of the effect is proportional to the force of the cause. Besides, there are many things in nature, the reasons of which depending on certain figures or quantities, are not assignable but from mathematical principles.

KNOWLEDGE, *Degrees of*. As to the different degrees, or clearness of our knowledge, it seems to lie in the different way which the mind has of perceiving the agreement or disagreement of any of its ideas. When the mind perceives this agreement or disagreement of two ideas immediately by themselves, without the intervention of any other, we may call it *intuitive* knowledge; in which case the mind perceives the truth, as the eye doth light, only by being directed towards it. Thus the mind perceives that white is not black; that three are more than two, and equal to one and two. This part of knowledge is irresistible; and, like the bright sunshine, forces itself immediately to be perceived, as soon as ever the mind turns its view that way. It is on this intuition that all the certainty and evidence of our other knowledge depends, which certainly every one finds to be so great, that he cannot imagine, and therefore cannot require a greater. The next degree of knowledge is, where the mind perceives not this agreement, or disagreement, immediately, or by the juxtaposition, as it were, of the ideas; because those ideas, concerning whose agreement, or disagreement, the inquiry is made, cannot, by the mind, be so put together as to shew it. In this case, the mind is obliged to discover the agreement, or disagreement, which it searches for, by the intervention of other ideas: and this is that which we call *reasoning*.

Thus, if we would know the agreement, or disagreement, in bigness, between the three angles of a triangle and two right angles, we cannot do it by an immediate view and comparison of them, because the three angles of a triangle cannot be brought together at once, and compared with any other one or two angles; and so of this the mind has no immediate or intuitive knowledge. But we must find out some other angles, to which the three angles of a triangle have equality; and, finding those equal to two right ones, we come to know the equality of these three angles to two right ones.

Those intervening ideas, which serve to shew the agreement of any two others, are called *proofs*; and where the agreement, or disagreement, is by this means plainly and clearly perceived, it is called *demonstration*; and a quickness in the mind to find those proofs, and to apply them right, is that which is called *agacuity*.

This knowledge, though it be certain, is not so clear and evident as intuitive knowledge; it requires pains and attention, and steady application of mind, to discover the agreement, or disagreement, of the ideas it considers; and there must be a progression by steps and degrees, before the mind can, in this way, arrive at any certainty. Before demonstration, there was a doubt, which, in intuitive knowledge, cannot happen to the mind, that has its faculty of perception

ception left in a degree capable of distinct ideas, no more than it can be a doubt to the eye (that can distinctly see white and black), whether this ink and paper be all of a colour. Now, in every step that reason makes in demonstrative knowledge, there is an intuitive knowledge of that agreement, or disagreement, it seeks, with the next intermediate idea, which it uses as a proof; for, if it were not so, that yet would need a proof, since, without the perception of such agreement, or disagreement, there is no knowledge produced.

By which it is evident, that every step in reasoning, that produces knowledge, has intuitive certainty; which when the mind perceives, there is no more required, but to remember it, to make the agreement, or disagreement, of the ideas, concerning which we inquire, visible and certain. This intuitive perception of the agreement, or disagreement, of the intermediate ideas in each step and progression of the demonstration, must also be exactly carried in the mind; and a man must be sure, that no part is left out, which, in long deductions, the memory cannot easily retain, and therefore this knowledge becomes more imperfect than intuitive, and men often embrace falsehoods for demonstrations.

It has been generally taken for granted, that mathematics alone are capable of demonstrative certainty: but to have such an agreement, or disagreement, as may be intuitively perceived, being, as we imagine, not the privilege of the ideas of number, extension, and figure alone, it may possibly be the want of due method and application in us, and not of sufficient evidence in things, that demonstration has been thought to have so little to do in other parts of knowledge. For, in whatever ideas the mind can perceive the agreement, or disagreement, immediately, there it is capable of intuitive knowledge, and, where it can perceive the agreement, or disagreement, of any two ideas, by the intuitive perception of the agreement, or disagreement, they have with any intermediate ideas, there the mind is capable of demonstration, which is not limited to the ideas of figure, number, extension, or their modes.

The reason why it has been generally supposed to belong to these only, is, because, in comparing their equality or excess, the modes of numbers have every the least difference very clear and perceivable; and, in extension, though every the least excess is not so perceptible, yet the mind has found out ways to discover the just equality of two angles, extensions, or figures; and both numbers and figures can be set down by visible and lasting marks. But, in other simple ideas, whose modes and differences are made and counted by degrees, and not quantity, we have not so nice and accurate a distinction of their differences, as to perceive or find ways to measure their just equality, or the least differences. For those other simple ideas being appearances, or sensations produced in us, by the size, figure, motion, &c. of minute corpuscles, singly insensible, their different degrees also depend on the variation of some or all of those causes; which, since it cannot be observed by us in particles of matter, whereof each is too subtle to be perceived, it is impossible for us to have any exact measures of the different degrees of these simple ideas.

Thus, not knowing what number of particles, nor what motion of them, is fit to produce any precise degree of whiteness, because we have no certain standard to measure them by, nor means to distinguish every the least difference; the only help we have is from our senses, which in this point fail us. But where the difference is so great as to produce

in the mind ideas clearly distinct, these ideas, as we see in colours of different kinds, blue and red for instance, are as capable of demonstration as ideas of number and extension; and what is here said of colours, holds true in all secondary qualities.

These two then, *intuition* and *demonstration*, are the degrees of our knowledge; and whatever comes short of one of these, is only *faith*, or *opinion*, not *knowledge*, at least in all general truths.

There is, indeed, another perception of the mind, employed about the particular existence of finite beings without us, which going beyond probability, but not reaching to either of the foregoing degrees of certainty, passes under the name of knowledge.

Nothing can be more certain, than that the idea we receive from an external object is in our minds: this is intuitive knowledge; but whether we can thence certainly infer the existence of any thing without us, corresponding to that idea, is that whereof some men think there may be a question made; because men may have such an idea in their minds, when no such thing exists, nor any such object affects their senses.

But it is evident, that we are invincibly conscious to ourselves of a different perception, when we look on the sun in the day, and when we think on it by night; when we actually taste wormwood, or smell a rose, or only think on that favour or odour; so that we may add, to the two former sorts of knowledge, this also of the existence of particular external objects, by that perception and consciousness we have of the actual entrance of ideas from them; and allow these three degrees of knowledge, *viz. intuitive, demonstrative, and sensitive*.

But, since our knowledge is founded on, and employed about, our ideas only, will it follow thence, that it must be conformable to our ideas, and that where our ideas are clear and distinct, obscure and confused, there our knowledge will be so too? We answer, No; for our knowledge consisting in the perception of the agreement, or disagreement, of any two ideas; its clearness or obscurity consists in the clearness or obscurity of that perception, and not in the clearness or obscurity of the ideas themselves. A man (for instance), who has a clear idea of the angles of a triangle, and of equality to two right ones, may yet have but an obscure perception of their agreement, and so have but a very obscure knowledge of it: but obscure and confused ideas can never produce any clear or distinct knowledge; because, as far as any ideas are obscure or confused, so far the mind can never perceive clearly, whether they agree or disagree; or, to express the same thing in other words, he that has not determined ideas to the words he uses, cannot make propositions of them, of whose truth he can be certain.

From all this it follows; 1. That we can have no knowledge farther than we have ideas.

2. That we have no knowledge farther than we can have perception of the agreement, or disagreement, of our ideas, either by intuition, demonstration, or sensation.

3. We cannot have an intuitive knowledge, that shall extend itself to all our ideas, and all that we would know about them; because we cannot examine and perceive all the relations they have one to another by juxtaposition, or in immediate comparison one with another. Thus, we cannot intuitively perceive the equality of two extensions, the difference of whose figures makes their parts incapable of an exact immediate application.

4. Our rational knowledge cannot reach to the whole extent of our ideas; because, between two different ideas which

we would examine, we cannot always find such proofs, whereby we can connect one to another with an intuitive knowledge in all the parts of the deduction.

5. Sensitive knowledge, reaching no farther than the existence of things actually present to our senses, is yet much narrower than either of the former.

6. From all which it is evident, that the extent of our knowledge comes not only short of the reality of things, but even of the extent of our own ideas. We have the ideas of a square, a circle, and equality; and yet, perhaps, shall never be able to find a circle equal to a square. See CIRCLE.

KNOWLEDGE, *Extent and Limits of.* The affirmations or negations we make concerning the ideas we have, being reduced to the four sorts above-mentioned, *viz.* identity, co-existence, relation, and real existence, let us inquire how far our knowledge extends in each of these.

1. As to identity and diversity, our intuitive knowledge is as far extended as our ideas themselves; and there can be no idea in the mind, which it does not presently, by an intuitive knowledge, perceive to be what it is, and to be different from any other.

2. As to the agreement or disagreement of our ideas of co-existence, our knowledge herein is very defective, though it is in this that the greatest and most material part of our knowledge, concerning substances, consists: for our ideas of substances being nothing but certain collections of simple ideas co-existing in one subject (our idea of flame, for instance, is a body, hot, luminous, and moving upwards); when we would know any thing farther concerning this; or any other sort of substance, what do we but enquire what other qualities, or powers, these substances have, or have not? which is nothing else but to know what other simple ideas do, or do not exist with those which make up such complex ideas. The reason of this is, that the simple ideas, which make up our complex ideas of substances, have no visible necessary connection, or inconsistency, with other simple ideas, whose co-existence with them we would inform ourselves about. These ideas being likewise, for the most part, secondary qualities, which depend upon the primary qualities of their minute or insensible parts, or on something yet more remote than these from our comprehension, it is impossible we should know which have a necessary union, or inconsistency, one with another; since we know not the root from whence they spring, or the size, figure, and texture of parts on which they depend, and from which they result. Besides this, there is no discoverable connection between any secondary quality, and those primary qualities that it depends on. We are so far from knowing what figure, size, or motion, produces (for instance) a yellow colour, or sweet taste, or sharp sound, that we can by no means conceive how any size, figure, or motion, can possibly produce in us the idea of any colour, taste, or sound, whatsoever; there being no conceivable connection between the one and the other.

Our knowledge, therefore, of co-existence reaches little farther than experience. Some few, indeed, of the primary qualities have a necessary dependence, and visible connection, one with another: as figure necessarily supposes extension; receiving or communicating motion by impulse supposes solidity: but qualities co-existent in any subject, without this dependence and connection, cannot certainly be known to co-exist, any farther than experience, by our senses, informs us. Thus, though, upon trial, we find gold yellow, weighty, malleable, fusible, and fixed; yet, because none of these have any evident dependence, or necessary connection, with the other, we cannot certainly know, that,

where any four of these are, the fifth will be there also, how highly probable soever it may be. But the highest degree of probability amounts not to certainty, without which there can be no true knowledge; for this co-existence can be no true knowledge; for this co-existence can be no farther known than it is perceived; and it cannot be perceived, but either, in particular subjects, by the observation of our senses, or, in general, by the necessary connection of the ideas themselves.

As to incompatibility, or repugnancy to co-existence, we know, that no subject can have of each sort of primary qualities more than one particular at once, as one extension, or one figure; and so of sensible ideas peculiar to each sense: for whatever, of each kind, is present in any subject, excludes all other of that sort; for instance, one subject cannot have two smells, or two colours, at the same time.

As to powers of substances, which make a great part of our enquiries about them, our knowledge reaches little farther than experience; because they consist in a texture and motion of parts, which we cannot by any means come to discover; and I doubt, whether, with those faculties we have, we shall ever be able to carry our general knowledge much farther in this part. Experience is that, which, in this part, we must depend on: and it were to be wished, that it were more improved. We find the advantages some men's generous pains have in this way brought to the stock of natural knowledge; and if others, especially the philosophers by fire, had been so wary in their observations, and sincere in their reports, as those who call themselves *philosophers* ought to have been, our acquaintance with the bodies here about us, and our insight into their powers and operations, might have been yet much greater.

As to the third sort, the agreement, or disagreement, of our ideas in any other relation; this is the largest field of knowledge, and it is hard to determine how far it may extend: this part depending on our sagacity in finding intermediate ideas, that may shew the habitudes and relations of ideas, it is a hard matter to tell when we are at an end of such discoveries. They who are ignorant of algebra, cannot imagine the wonders of this kind that are to be done by it: and what farther improvements aid helps, advantageous to other parts of knowledge, the sagacious mind of man may yet find out, it is not easy to determine.

This, at least, we may believe, that the ideas of quantity are not the only ones capable of demonstration and knowledge; and that other, and, perhaps, more useful parts of contemplation, would afford us certainty, if vices, passions, and domineering interest, did not oppose or menace endeavours of this kind.

As to the fourth sort of knowledge, *viz.* of the *real, actual existence of things*, we have an intuitive knowledge of our own existence, a demonstrative knowledge of the existence of God, and a sensitive knowledge of the objects that present themselves to our senses.

Hitherto we have examined the extent of our knowledge, in respect of the several sorts of beings that are: there is another extent of it, in respect of universality, which will also deserve to be considered; and this, in regard to our knowledge, follows the nature of our ideas. If the ideas, whose agreement, or disagreement, we perceive are abstract, our knowledge is universal; for what is known of such general ideas, will be true of every particular thing, in which that essence, that is, that abstract idea, is found: and what is once known of such ideas, will be perpetually and for ever true; so that, as to all general knowledge, we must search and find it only in our own

minds; and it is only the examining our own ideas that furnishes us with it. Truth belonging to essences of things (that is, to abstract ideas) are eternal, and are to be found out by the contemplation only of those essences; as the existence of things is to be known only from experience.

KNOWLEDGE, *Reality of.* It is evident, that the mind knows not things immediately, but by the intervention of the ideas it has of them. Our knowledge, therefore, is real, only so far as there is a conformity between our ideas, and the reality of things. But how shall we know when our ideas agree with things themselves? It is answered, There are two sorts of ideas, that we may be assured agree with things: these are,

1. *Simple ideas*, which, since the mind can by no means make to itself, must be the effect of things operating upon the mind in a natural way, and producing therein those perceptions, which, by the will of our Maker, they are ordained and adapted to. Hence it follows, that simple ideas are not fictions of our fancies, but the natural and regular production of things without us, really operating upon us, which carry with them all the conformity our state requires, which is to represent things under those appearances they are fitted to produce in us. Thus the idea of whiteness, as it is in the mind, exactly answers that power which is in any body to produce it there; and this conformity between our simple ideas, and the existence of things, is sufficient for real knowledge.

2. All our *complex ideas*, except only those of substances, being archetypes of the mind's own making, and not referred to the existence of things, as to their originals, cannot want any conformity necessary to real knowledge; for that which is not designed to represent any thing but itself, can never be capable of a wrong representation. Here the ideas themselves are considered as archetypes, and things are no otherwise regarded than as conformable to them. Thus, the mathematician considers the truth and properties belonging to a rectangle, or circle, only as they are ideas in his own mind, which possibly he never found existing mathematically, that is, precisely true; yet his knowledge is not only certain, but real, because real things are no farther concerned, nor intended to be meant by any such propositions, than as things really agree to those archetypes in the mind.

3. But the *complex ideas*, which we refer to archetypes without us, may differ from them; and so our knowledge about them may come short of being real: and such are our ideas of substances. These must be taken from something that does, or has existed, and not be made up of ideas arbitrarily put together, without any real pattern. Herein, therefore, is founded the reality of our knowledge concerning substances, that all our complex ideas of them must be such, and such only as are made up of such simple ones as have been discovered to co-exist in nature: and our ideas, being thus true, though not, perhaps, very exact copies, are the subject of real knowledge of them. Whatever ideas we have, the agreement we find they have with others will be knowledge. If those ideas be abstract, it will be general knowledge; but to make it real concerning substances, the ideas must be taken from the real existence of things. Wherever, therefore, we perceive the agreement, or disagreement, of our ideas, there is certain knowledge; and wherever we are sure those ideas agree with the reality of things, there is certain, real knowledge.

KNOWLEDGE, *method of improving or enlarging.* It being the received opinion amongst men of letters, that maxims are the foundation of all knowledge, and that sciences are each of them built upon certain præcognita, from whence

the understanding is to take its rise, and by which it is to conduct itself in its enquiries in the matters belonging to that science: the beaten road of the school has been to lay down, in the beginning, one or more general propositions, called *principles*, as foundations whereon to build the knowledge that was to be had of that subject.

That which gave occasion to this way of proceeding was, the good success it seemed to have in mathematics, which of all the sciences have the greatest certainty, clearness, and evidence in them. But, if we consider it, we shall find, that the great advancement and certainty of real knowledge men arrive to in these sciences, was not owing to the influence of those principles, but to the clear, distinct, and complete ideas their thoughts were employed about, and to the relation of equality and excess, so clear between some of them, that they had an intuitive knowledge, and by that a way to discover it in others, and this is without the help of those maxims. For is it not possible for a lad to know, that his whole body is bigger than his little finger, but by virtue of this axiom, the whole is bigger than a part; nor be assured of it till he has learned that maxim? Let any one consider which is known first and clearest by most people, the particular instance, or the general rule; and which it is that gives life and birth to the other: these general rules are but the comparing our more general and abstract ideas, which ideas are made by the mind, and have names given them, for the easier dispatch in its reasonings: but knowledge began in the mind, and was founded on particulars, though afterwards, perhaps, no notice be taken thereof, it being natural for the mind to lay up those general notions, and make the proper use of them, which is to disburden the memory of the cumbersome load of particulars. The way to improve in knowledge is, not to swallow principles with an implicit faith, and without examination, which would be apt to mislead men, instead of guiding them into truth; but to get and fix in our minds clear and complete ideas, as far as they are to be had, and to annex to them proper and constant names; and thus, barely by considering our ideas, and comparing them together, observing their agreement or disagreement, their habitudes and relations, we shall get more true and clear knowledge by the conduct of this one rule, than by taking up principles, and thereby putting our minds into the disposal of others.

We must, therefore, if we would proceed as reason advises us, adapt our methods of enquiry to the nature of the ideas we examine, and the truth we search after. General and certain truths are only founded on the habitudes and relations of abstract ideas; therefore, a sagacious, methodical application of our thoughts for the finding out these relations, is the only way to discover all, that can with truth and certainty be put into general propositions. By what steps we are to proceed in these, is to be learned in the schools of the mathematicians, who from very plain and easy beginnings, by gentle degrees, and a continued chain of reasonings, proceed to the discovery and demonstration of truths, that, at first sight, appeared beyond human capacity. This may reasonably be said, that, if other ideas that are real, as well as nominal essences of their species, were pursued in a way similar to that of mathematicians, they would carry our thoughts farther, and with greater evidence and clearness, than possibly we are apt to imagine. This is reason sufficient to advance that conjecture above mentioned; viz. "That morality is capable of demonstration, as well as mathematics;" for moral ideas being real essences, which have a discoverable connection and agreement one with another, so far as we can find their habitudes and relations, so far we shall be possessed of real and general truths.

In our knowledge of substances, we are to proceed after a quite different method; the bare contemplation of their abstract ideas (which are but nominal essences) will carry us but a very little way in the search of truth and certainty. Here experience must teach us what reason cannot; and it is by trying alone, that we can certainly know what qualities co-exist, with those of our complex idea; for instance, whether that yellow, heavy, fusible body, we call *gold*, be malleable, or not; which experience (however it prove in that particular body we examine) makes us not certain that it is so in all, nor any other yellow, heavy, fusible bodies, but that which we have tried; because it is no consequence, one way or other, from our complex idea. The necessity or inconstancy of malleability has no visible connection with the combination of that colour, weight, and fusibility, in any body. What is here said of the nominal essence of gold, supposed to consist of a body of such a determinate colour, weight, and fusibility, will hold true if other qualities be added to it. Our reasonings from those ideas will carry us but a little way in the certain discovery of the other properties in those masses of matter wherein all those are to be found. As far as our experience reaches, we may have certain knowledge, and no farther. It is not denied, but that a man, accustomed to rational and regular experiments, shall be able to see farther into the nature of bodies, and their unknown properties, than one that is a stranger to them; but this is but judgment and opinion, not knowledge and certainty.

This would make it suspected, that natural philosophy is not capable of being made a science. From experiments, and historical observations, we may draw advantages of ease and health, and thereby increase our stock of conveniences for this life; but beyond this, it is to be feared our talents reach not, nor are our faculties able to advance farther. See *PHYSICS*.

The ways to enlarge our knowledge, as far as we are capable, seem to be these two: the first is, to get and settle in our minds, as far as we can, clear, distinct, and constant ideas of those things we would consider and know; for it being evident that our knowledge cannot exceed our ideas, where they are either imperfect, confused, or obscure, we cannot expect to have certain, perfect, or clear knowledge. The other art is, of finding out the intermediate ideas, which may shew us the agreement or repugnancy of other ideas, which cannot be immediately compared.

That these two (and not relying on maxims, and drawing consequences from some general propositions) are the right method of improving our knowledge in the ideas of other modes, besides those of quantity, the consideration of mathematical knowledge will easily inform us; where, first, we shall find, that he, who has not clear and perfect ideas of those angles or figures, of which he desires to know any thing, is utterly thereby incapable of any knowledge about them. Suppose a man not to have an exact idea of a right angle, scalenum, or trapezium, and it is clear, that he will in vain seek any demonstration about them.

And farther, it is evident, that it was not the influence of maxims or principles that led the masters of this science into those wonderful discoveries they have made: let a man of good parts know all the maxims of mathematics ever so well, and contemplate their extent and consequences as much as he pleases, he will, by their assistance, scarce ever come to know, that the square of the hypothenuse in a right-angled triangle, is equal to the squares of the two other sides. This, and other mathematical truths, have been discovered by the thoughts otherwise applied. The mind had other objects, other views before it, far different from those

maxims, which men, well enough acquainted with those received axioms, but ignorant of their method who first made those demonstrations, can never sufficiently admire.

Our knowledge, as in other things, so in this also, has so great a conformity with our sight, that it is neither wholly necessary, nor wholly voluntary. Men, who have senses, cannot choose but receive some ideas by them; and, if they have memory, they cannot but retain some of them; and if they have any distinguishing faculty, cannot but perceive the agreement, or disagreement, of some of them one with another. As he that has eyes, if he will open them by day, cannot but see some objects, and perceive a difference in them; yet he may choose whether he will turn his eyes towards an object, curiously survey it, and observe accurately all that is visible in it. But what he doth see he cannot see otherwise than he doth; it depends not on his will to see that black which appears yellow. Just thus it is with our understanding: all that is voluntary in our knowledge, is the employing or withholding any of our faculties from this or that sort of objects, and a more or less accurate survey of them; but, they being employed, our will hath no power to determine the knowledge of the mind one way or another; that is done only by the objects themselves, as far as they are clearly discovered. Thus, he that has got the ideas of numbers, and has taken the pains to compare one, two, or three, to six, cannot choose but know they are equal. He also, that hath the idea of an intelligent, but weak and frail being, made by, and depending on, another, who is eternal, omnipotent, and perfectly wise and good, will as certainly know, that man is to honour, fear, and obey God, as that the sun shines when he sees it. But yet, be these truths ever so certain, ever so clear, he may be ignorant of either or both of them, who will not take the pains to employ his faculties, as he should, to inform himself about them.

**KNOWLTON**, in *Geography*, a township of America, in Sussex county, New Jersey, containing 1937 inhabitants.

**KNOWLTONIA**, in *Botany*, so named by Mr. Salisbury in memory of Mr. Thomas Knowlton, who is said to have been Sherard's gardener at Eltham. *Salif. Prodr.* 372. Sims in *Curt. Mag.* v. 22. 775. (Ananmia; Venten. Malmaif. 22.)—Class and order, *Polyandria Polygynia*. Nat. Ord. *Muliflorique*, Linn. *Ranunculaceae*, Juss.

Gen. Ch. *Cal.* none. *Cor.* Petals numerous, from ten to twenty, oblong, without any nectary, deciduous, the innermost longest and nearly linear; outermost somewhat ovate, externally hairy. *Stam.* Filaments numerous, thread-shaped, much shorter than the petals; anthers vertical, two-lobed, roundish, thick-edged, bursting at the edges. *Pist.* Germens superior, numerous, ovate, collected into a round head; styles lateral, awl-shaped; stigmas simple, slightly recurved. *Peric.* Berries numerous, distinct, elliptical, pointed, of one cell. *Seed* solitary, large, smooth, of the shape of the pericarp, and attached to its base. *Receptacle* globose.

Eff. Ch. Calyx none. Petals numerous, oblong, destitute of a nectary. Receptacle of the fruit globose. Berries numerous, of one cell. Seeds solitary.

Obs. Mr. Salisbury separated this very distinct genus from the Linnæan *Adonis*, and published it in 1796, by the above unexceptionable name, which therefore takes place of Ventenat's *Ananmia*, published several years after; the latter being moreover liable to objection, from strict Linnæan scholars, as being formed of an Arabic word.

1. *K. capensis*. Hairy Knowltonia. (*K. vesicatoria*; Sims in *Curt. Mag.* t. 775. *Adonis capensis*; Linn. Sp. Pl. 772. Suppl.

Suppl. 272. *Anamenia hirsuta*; Venten. Malmalf. 22. n. 4. *Chirilophoriana trifoliata, foliis feabris, flore sulphureo-rariore*; Burn. Afr. 145. t. 51.—Hairy. Leaves twice ternate; leaflets elliptic-ovate. Petals linear.—Native of the Cape of Good Hope. With us it is a hardy green-house plant, flowering in the spring. *Root* perennial, and, as appears from Dr. Sims's description, of long duration, the plant from which his figure was taken, in 1804, having come out of Dr. Fothergill's collection near 25 years before. *Leaves* several, radical, on long hairy stalks, twice ternate; their leaflets elliptical, or somewhat ovate, ferrated, more or less hairy, the terminal ones usually largest. *Stems* taller than the leaves, branched nearly from their very bottom, hairy, almost leafless; their branches elongated, subdivided, somewhat corymbose; ultimate ones umbellate, single-flowered, very hairy. *Bractæas* leafy; the upper ones narrowest, lanceolate and entire. *Flowers* an inch broad, spreading, of a light yellow with green.

2. *K. vesicatoria*. Blistering Knowltonia. (*Adonis vesicatoria*; Linn. Suppl. 272 Willd. Sp. Pl. v. 2. 1307. *Anamenia coriacea*; Venten. Malmalf. 22. n. 1. t. 22. *A. lasperitifolia*; *ibid.* n. 2. *Ranunculus æthiopicus, foliis rigidis, floribus ex luteo viridicentibus*; Comm. Hort. v. 1. t. 1. *Imperatoria ranunculoides africana cneaphylos, lasperitifolia foliis rigidis, margine spinosis*; Pluk. Phyt. t. 95. f. 2.)—Smooth, leaves twice ternate; leaflets nearly heart-shaped, coriaceous; the lateral ones unequal at their base. Petals elliptic-oblong. Umbels compound, many-flowered.—Native of the Cape of Good Hope, and occasionally kept in green-houses, like the preceding, from which we cannot but think it specifically different. The *leaves* are much larger, smooth, very thick and rigid, with strong, almost pungent, ferratures or teeth; sometimes they are thrice compounded. *Stems* more umbellate in all their subdivisions, the ultimate umbels consisting of very numerous stalks, which are but slightly hairy. *Bractæas* rather elliptical. *Petals* elliptic-oblong rather than linear. *Berries* purplish black. Thunberg says that the leaves are used at the Cape to raise blisters, they having that property in common with some species of *Ranunculus* and *Clematis*, their near allies.

3. *K. gracilis*. Slender Knowltonia. (*Anamenia gracilis*; Venten. Malmalf. 22. n. 3. *Adonis æthiopica*; Thunb. Prodr. 94?)—Leaflets ovate, deeply ferrated, rigid, hairy. *Stems* branched at the top; branches erect, with few flowers." *Vent.*—We know nothing of this but from the definition of Ventenat, who saw it in Justici's herbarium. Thunberg, whom he quotes with doubt, defines his plant thus. "Leaves more than twice compound; leaflets deeply toothed, divaricated. Stem villous."—With this we have no further acquaintance, unless, as we strongly suspect, it is the same as the following; but if so, it by no means answers to the character given in Ventenat's work.

4. *K. filia*. Fine-leaved Knowltonia. (*Adonis filia*; Linn. Suppl. 271. A. *æthiopica*; Thunb. Prodr. 94? *A. daucifolia*; Lamarek. Dict. v. 1. 46. *Anamenia daucifolia*; Venten. Malmalf. 22. n. 5.)—Leaves twice ternate; leaflets pinnatifid, deeply cut, smooth, their segments decurrent. Flower-stalks hairy.—The only specimen we have seen was given to Linnæus, by Thunberg, who gathered it at the Cape. We presume, therefore, it must be his *Adonis æthiopica*, with the character of which, cited under our last species, it sufficiently tallies. The *leaves* are finely divided, but not sufficiently like a *Daucus* to warrant Lamarek's change of the original name, however unmeaning that may be. The *stem* is tall and slender, bearing two hairy-stalked umbels. Lower *bractæas* compound. *Petals* nearly linear. La-

marek's account seems entirely taken from the *Supplementum* of Linnæus. S.

KNOX, JOHN, in *Biography*, the intrepid and successful promoter of the Reformation in Scotland, was descended from an ancient family, and born near Haddington, in East Lothian, in the year 1505. Having received the elementary parts of a good education, he was, at a proper time, sent to the university of St. Andrews, where he applied himself with uncommon diligence in the studies of the place, made a very rapid proficiency, and was admitted to the degree of M.A. at an early age. Having determined to embrace the ecclesiastical profession, he was admitted to priest's orders before the period usually allowed by the canons. He now commenced teacher, and acquired great applause in that capacity. But by instructing others, he discovered the errors of the common system in which he had been educated, and which he had endeavoured to establish in the minds of the people. Feeling dissatisfied with what he was engaged in, he chose rather to be a hearer than a preacher, and frequented the discourses of Thomas Williams, a black-friar, who publicly preached against the pope's authority, and who was the first from whom Mr. Knox received any taste for the truth. About the same time, Mr. George Wishart, another celebrated reformer, coming from England, with the commissioners sent by king Henry VIII. Knox learned from him the principles of the reformed religion, and with these he was so well pleased, that from this moment he renounced Popery and became a zealous Protestant. Mr. Knox had quitted St. Andrews a little before this entire change of his opinions, having been appointed tutor to the sons of the lairds of Ormilton and Langnirny, who were both favourers of the Reformation. Knox intruded into the minds of his pupils the principles of piety and the Protestant religion, notice of which being given to David Beaton, cardinal and archbishop of St. Andrews, that prelate persecuted him with such severity that he was obliged to abscond, and frequently to change the place of his concealment. He thought of retiring into Germany, but was dissuaded from it by the fathers of his pupils, and he took shelter with them in St. Andrews castle, which was then in possession of the Leslies, the determined friends of the Reformation. In this asylum he continued to instruct his pupils, and he gave them public lectures in theology, which he delivered at a stated hour in the chapel, within the walls of the castle. These were frequented by several persons of note in the city, who entreated Mr. Knox to take upon himself the office of preacher, to which, though with great reluctance, he agreed to comply. He began his public ministry at St. Andrews, in the year 1547, with that success which always accompanies a bold and popular eloquence. He without hesitation struck at the root of Popery, and attacked both the doctrine and discipline of the established church with a vehemence peculiar to himself, but well adapted to the temper and wishes of the age. In his first sermon he proved, to the satisfaction of his hearers, that the pope was antichrist, and that the doctrine of the Roman church was contrary to the doctrine of Christ and his apostles. He shortly made converts of all the people in the castle, and of great numbers in the city, who even joined him in partaking of the Lord's supper. In the month of July 1547, an interruption took place in the exercise of Mr. Knox's ministry, in consequence of the surrender of the castle to the French, when he was carried prisoner with the garrison to France. He remained in confinement in the galleys till the latter end of the year 1549, when, being set at liberty, he passed over to England, and arriving at London, was licensed either by Cranmer, or Somerset,

the protector, and appointed preacher, first at Berwick, and afterwards at Newcastle. In 1552, he was appointed one of six chaplains, whom the council thought proper to retain in the service of king Edward VI., not only to attend the court, but to be itinerary preachers of the Protestant religion throughout the kingdom; he had also the grant of forty pounds a year till some benefit should be procured for him. Shortly after he was offered the living of All-hallows, which he refused, not choosing to conform to the liturgy. Soon after the accession of queen Mary, he thought it right to retire from the impending storm; he accordingly went to Geneva, where he had not resided long before he was invited by the English refugees at Frankfort to become their minister: this invitation he accepted, though against his will, through the interference of John Calvin, and he continued his services among them till some internal disputes about ceremonies broke up their society. Some of the English, particularly Dr. Cox, afterwards bishop of Ely, wished for a liturgy according to king Edward's form, but Knox and others preferred the Geneva service; at length the party of Cox, to get rid of the Scotch reformer, taking advantage of certain unguarded expressions in one of his former publications, threatened to accuse him of treason unless he quitted the place, which he did, and went again to Geneva. In 1555, he went to Scotland; upon his arrival, finding the professors of the Protestant religion greatly increased in number, he formed them into a society, associated with them, and commenced his preaching with the usual vehemence. He had an opportunity, in the course of a few months, to preach in various parts of Scotland, and in all the places the people flocked in great crowds to hear him. The Popish clergy began to be alarmed at the consequences of his discourses, which were daily making converts, and summoned him to appear before them in the church of Black-friars in Edinburgh: he, having received assurances of support from various persons of rank and estimation, determined to obey the summons, but before the day arrived, his enemies thought fit to abandon the prosecution. Knox, however, went to Edinburgh, and as he was not allowed to vindicate his cause in the presence of his opponents, he preached twice every day for ten days to the people, and had on these occasions more numerous audiences than he had before witnessed. Emboldened by success, he wrote a letter to the queen regent, urging her to hear the Protestant doctrine, which she declined, and Mr. Knox afterwards published his letter with some additions. In the summer of 1556, Mr. Knox set out for Geneva, at the earnest entreaty of the English congregation, and almost the moment in which he embarked, the bishops summoned him to appear before them, and upon his non-appearance, they passed sentence of death upon him as a heretic, and burnt him in effigy at Edinburgh. Against this wicked sentence he appealed, in a work which he printed at Geneva, and which contains a masterly defence of religious independency, and is distinguished for purity of style. In 1557, he was invited back to Scotland, and having consulted Calvin and other persons as to the prudence and necessity of the step, he set out, and had proceeded as far as Dieppe, when he was advised that some of his best friends seemed, through timidity, to be abandoning their principles, and that therefore it would not be safe for him to proceed. He immediately wrote letters to those who had invited him, complaining of their irresolution, and even denouncing the severe judgments of God on all those who should betray the cause of truth and of their country, by weakness or apathy. These letters made such an impression on those to whom they were immediately addressed,

that they all came to a written resolution, "that they would follow forth their purpose, and commit themselves, and whatever God had given them, into his hands, rather than suffer idolatry to reign, and the subjects to be defrauded of the only food of their souls." To secure each other's fidelity to the Protestant cause, a common bond, or covenant, was entered into by them, dated at Edinburgh, December 3, 1557, and from this period they were distinguished by the name of "The Congregation." In the mean time Mr. Knox returned to Geneva, where, in 1558, he published his treatise, entitled "The first Blast of the Trumpet against the monstrous Regiment of Women;" which was written in detestation of the cruel and infamous government of queen Mary, and of the endeavours of the queen-regent of Scotland to establish arbitrary government in that kingdom. He intended to have followed this with "The second Blast," but the death of Mary prevented him going any farther. He expected much from the government of Elizabeth. She had, however, been so disgusted by what he had written against the government of women, that she embraced an early opportunity of displaying her resentment against him. She refused his request of preaching to his friends in England, in his way from the continent, and rendered his abode there so uncomfortable, that he was glad to make the best of his road to Scotland, where he arrived in the month of May 1559. At this time a public prosecution was carried on against the Protestants, and their trial was just ready to commence at Stirling; Knox instantly hurried to share with his brethren in the threatened danger, or to assist them in their common cause. Dr. Robertson, in describing this business, says, "While their minds were in that ferment which the queen's perfidiousness and their own danger occasioned, Knox mounted the pulpit, and, by a vehement harangue against idolatry, inflamed the multitude with the utmost rage. The indifferency of a priest, who, immediately after Knox's discourse, was seen preparing to celebrate mass, and began to decorate the altar for that purpose, precipitated them into immediate action. With tumultuous, but irresistible violence, they fell upon the churches in that city, overturned the altars, defaced the pictures, broke in pieces the images, and proceeding next to the monasteries, laid those sumptuous fabrics almost level with the ground. This riotous insurrection was not the effect of any concert, or previous deliberation. Censured by the reformed preachers, and publicly condemned by the persons of most power and credit with the party, it must be regarded merely as an accidental eruption of popular rage." From this time Mr. Knox continued to promote the reformation by every means in his power, sparing no pains, nor fearing any danger. Mr. Knox, by his correspondence with secretary Cecil, was chiefly instrumental in establishing those negotiations between "The Congregation" and the English, which terminated in the march of an English army into Scotland to assist the Protestants, and to protect them against the persecutions of the queen-regent. This army, being joined by almost all the great men of Scotland, proceeded with such vigour and success, that they obliged the French forces, who had been the principal supports of the tyranny of the regent, to quit the kingdom, and restored the parliament to its former independency. Of that body, a great majority had embraced the Protestant opinions, and encouraged by the zeal and number of their friends, they improved every opportunity in overthrowing the whole fabric of Popery. They sanctioned the confession of faith presented to them by Knox, and the other reformed teachers: they abolished the jurisdiction of the ecclesiastical courts, and transferred

the causes to the cognizance of the civil courts; and they prohibited the exercise of religious worship, according to the rites of the Romish church. In the year 1561, Mary queen of Scots, the widow of Francis II. king of France, arrived in her native country, from which she had been absent more than twelve years, though she was then scarcely nineteen. On the Sunday after her arrival the commanded mas was celebrated in the chapel of her palace: the Protestants, from low murmurs, began to exclaim loudly against the practice, and Knox, with his usual vehemence, declared from the pulpit, "that one mas was more frightful to him than ten thousand armed enemies landed in any part of the realm." Knox himself frequently insulted her from the pulpit, and when admitted into her presence, regardless of her sex, her beauty, and her rank, behaved to her with very unjustifiable freedom. He avowed himself the author of "The Blast," and contended for the right of teaching and propagating doctrines contrary to the common opinion, and concluded a long conference by saying, "If the realm finds no inconvenience in the regiment [government] of a woman, I shall be well content to live under your Grace, as Paul was under Nero. And my hope is that so long as ye defile not your hands with the blood of the saints of God, neither I nor the book shall either hurt you or your authority; for in very deed, madam, that book was written most especially against the wicked Jezebel of England." In 1562, Mr. Knox was employed in bringing about a reconciliation between the earls of Bothwell and Arran, which shews in what estimation he was held by persons of the highest rank in the state. In the same year he was appointed, by the general assembly, commissioner to the counties of Kyle and Galloway, and by his influence several gentlemen entered into a bond or covenant at Ayr, similar to that entered into at Edinburgh in 1557. About the same time he accepted a challenge, made by the prior of Whithorn, to a public disputation upon the mas, which continued for the space of three days, and the substance of which was afterwards published. In 1563, during the queen's absence on a progress to the west of Scotland, the Protestants at Edinburgh excited a riot in the chapel royal while mas was celebrating: of these some of the most active were seized in order to be brought to trial. Knox, determined to assist and succour them, and being authorized by the last general assembly to give information to the whole body of Protestants in Scotland, should any circumstance arise that might threaten danger to the reformation; issued circular letters, requiring all who professed the true religion, or were concerned in its preservation, to assemble at Edinburgh on the day of trial, that they might comfort and assist their distressed brethren. One of these letters fell into the hands of the queen, and it was immediately construed into an act of treason, for which he was indicted, brought to trial, and acquitted. His conduct was also approved by the general assembly of the church, which met soon afterwards. In 1565, lord Darnley, who had lately married the queen, contented, at the desire of his friends, to hear Mr. Knox preach, in hopes thereby of conciliating him, instead of which he took occasion to declaim against the government of wicked princes, who, for the sins of the people, are sent as tyrants and scourges to torment them. Darnley complained of the insult, and the council silenced the preacher for several days. In the same year he was appointed by the assembly to visit and establish the churches in the south; and he was the bearer of a letter from the assembly to the bishops of England, drawn up by himself; the purport of which was to complain of the severe treatment of the English Puritans, and to solicit indulgence for them. In 1571,

he found it expedient to consult his own safety by withdrawing from Edinburgh, and in the following year, as he knew his enemies were plotting his destruction, he went first to Abbot's-hall, in Fife, and from thence to St. Andrews, where he remained till August 1572. When the troubles of the country were in some measure abated, the people of Edinburgh, who had been obliged to leave it, returned, and sent a deputation to St. Andrews, to invite Mr. Knox to resume his ministry among them. He accepted the invitation, on condition that they would allow him to speak to them according to the dictates of his conscience, as in former times, and on the last day of August he preached to them in the great kirk. His voice was, however, very weak, and his health was evidently declining. The news of the accursed massacre of Protestants at Paris gave the finishing blow to his already shattered constitution: he, nevertheless, mustered sufficient strength to preach against the bloody deed, and with much energy denounced God's vengeance on the wicked actors in it, of which he desired the French ambassador might be informed. From the moment that he had finished his discourse, his approaching dissolution was observed with the utmost concern by his friends. During a long illness he discovered the utmost fortitude, and met the approaches of death with a magnanimity worthy of his high character. He anticipated with joy the prospects of immortality, and exulted in the expectation of being released from the infirmities of the body. He died November 24th, 1572, in the sixty-seventh year of his age; his corpse was attended to the grave by several of the nobility then in Edinburgh, particularly by earl Morton, who was regent at the time, and who exclaimed, when he saw the body deposited in the ground, "there lies he, who never feared the face of man; who hath often been threatened with the dagger, but hath yet ended his days in peace and honour: for he had God's providence watching over him in an especial manner, when his very life was sought." The private life of this eminent reformer was irreproachable and exemplary, and the world is not a little indebted to him for that degree of light and religious liberty which it enjoys: "He was," says Dr. Robertson, "the prime instrument of spreading and establishing the reformed religion in Scotland. Zeal, integrity, disinterestedness, were virtues which he possessed in an eminent degree. He was acquainted, too, with the learning cultivated among divines in that age, and excelled in that species of eloquence, which is calculated to rouse and inflame. His maxims, however, were often too severe, and the impetuosity of his temper excessive. Rigid and uncompromising himself, he shewed no indulgence to the infirmities of others. Regardless of the distinctions of rank and character, he uttered his admonitions with acrimony and vehemence, more apt to irritate than to reclaim. This often betrayed him into indecent and undutiful expressions with respect to the queen's person and conduct. Those very qualities, however, which now render his character less amiable, fitted him to be the instrument of Providence for advancing the reformation among a fierce people, and enabled him to face dangers, and to surmount opposition, from which a person of a more gentle spirit would have been apt to shrink back." After the death of this great man, his "History of the Reformation of Religion in the Realm of Scotland, &c." was published in a folio volume. To the fourth edition of which, printed in 1732, several of his other pieces were added. There are, among the Harleian MSS. in the British Museum, two pieces attributed to Mr. Knox, one is a letter to his wife, and the other a treatise addressed to the faithful in London, Newcastle, and Berwick. Biog. Brit. Robertson's Hist. of Scotland.

**KNOX**, in *Geography*, a county of Kentucky, containing 1119 inhabitants.—Also, a county of Tennessee, in Hamilton district, bounded on the S. by Blount county and W. by the Indiana territory, and watered by the rivers Holston and Clinch. It contains 11,681 inhabitants, of whom 1122 are slaves.—Also, a county in the Indiana territory, erected in June, 1790, and containing 2517 inhabitants, of whom 28 are slaves. Fort Knox is in the same territory.—Also, one of the two islands discovered by captain Ingraham; the other being Hancock, called by captain Roberts, who soon after discovered them, Freeman and Langdon. These islands had every appearance of fertility. Their latitude is from 83° to 85° S., and their longitude very nearly 141° W. from Greenwich.

**KNOXIA**, in *Botany*, a genus named by Linnaeus, in honour of Robert Knox, an Englishman, who spent many years in examining the natural productions of Ceylon, and who published at London, in folio, an "Historical relation" of that island in the year 1681. In this work, "the botanical descriptions," says Haller, "shew him to have been well skilled in the knowledge of plants." It was translated into German, and published in quarto at Leipzig in 1689. A French edition of it appeared, in two volumes octavo, at Amsterdam, in 1693.—Linn. Gen. 51. Schreb. 68. Willd. Sp. Pl. v. 1. 582. Mart. Mill. Dict. v. 3. Juss. 197. Lamarck. Dict. v. 3. 369. Illustr. t. 59. Gært. t. 25.—Clas and order, *Telandria Monogynia*. Nat. Ord. *Stellatae*, Linn. *Rubiaceae*, Juss.

Gen. Ch. *Cal.* Perianth superior, small, deciduous, of four acuminate leaves; one lanceolate, triple the size of the rest. *Cor.* of one petal, funnel-shaped; tube thread-shaped, long; limb deeply divided into four, equal, rather oblong, rounded segments. *Stam.* Filaments four, capillary, situated within the throat of the corolla; anthers oblong, equal. *Pist.* Germen roundish, inferior; style thread-shaped, as long as the stamens; stigma two, capitate. *Peric.* Fruit naked, somewhat globular, pointed, furrowed. *Seeds* two, roundish, pointed, outwardly convex, marked with three streaks; flat within, and affixed at the upper part to a thread-like receptacle.

*Effl.* Ch. Corolla of one petal, funnel-shaped. Seeds two, furrowed. One leaf of the calyx larger than the rest.

1. *K. zeylanica*. Linn. Sp. Pl. 151. Fl. Zeylan. 189; Burm. Ind. 34. t. 13. f. 2. (*Veronica* affinis; Pluk. Phyt. t. 114. f. 2.)—"Flowers in spikes. Leaves smooth."—Found in Ceylon, upon the trunks of rotten trees.—This plant in appearance is like a *Plumbago* or *Lychnis*. *Stem* erect, a foot high, smooth, jointed. *Leaves* opposite, lanceolate, nearly sessile. *Spikes* long, narrow, with scattered, sessile flowers.

2. *K. corymbosa*. Pootumby of the Malabars. Willd. n. 2. (*Planta Maderaspatana*; Pluk. Amalt. 172. t. 454. f. 2. *K. stricta*; Gært. v. 1. 122. t. 25. f. 83.)—"Flowers corymbosae. Leaves downy beneath."—A native of the East Indies and found near Velore.—*Stem* pubescent. *Leaves* two together, pointed, on footstalks, lanceolate, smooth above, covered on the under side with short thick hairs. *The inflorescence* in size and habit is like that of *Valeriana dioica*. *Flowers* on footstalks. *Seeds* small, striated, disposed in an umbel at the summit of the stem. We have little doubt but that Willdenow is perfectly correct in presuming this to be the *K. stricta* of Gærtner.

**KNOXVILLE**, in *Geography*, a post-town of America, the metropolis of the state of Tennessee, situated in Knox county, on the N. side of Holston river, where it is 300 yards wide, on a beautiful spot of ground, 22 miles above

the junction of the Holston with the Tennessee, and four below the mouth of French Broad river. This town is flourishing, and communicates by post with every part of the United States. It is regularly laid out, and contains 518 inhabitants, a court-house, gaol, and barracks large enough to contain 700 men. The supreme courts of law and equity for the district of Hamilton are held here every half year, and the courts of pleas and quarter-sessions for Knox county are also held here. A college has been established in this town by government, called "Blount college." N. lat. 35° 48'. W. long. 83° 44'.

**KNUCKLE POINT**, a cape on the N.E. coast of New Zealand. S. lat. 34° 51'. W. long. 186° 21'.

**KNUCKLE-TIMBERS**, in a *Ship*, are the upper or top timbers next the beak-head, whose heads standing perpendicular, and the heels or lower part partaking of the hollow of the top side, form an angle or knuckle near the plank-sheer.

**KNUD'S HOVED**, in *Geography*, a cape of Denmark, on the E. coast of Sleswick, eight miles N.E. of Haderleben. N. lat. 55° 20'. E. long. 9° 40'.—Also, a cape of Denmark, on the E. coast of the island of Fyen, projecting into the Great Belt, and forming a bay on the S. of the town of Nyeborg. N. lat. 55° 17'. E. long. 10° 52'.—Also, a cape of Denmark, on the S.W. coast of the island of Zealand. N. lat. 55° 5'. E. long. 11° 37'.

**KNUTSFORD**, a considerable market town in the hundred of Bucklow, and county of Chester, England, is seated on the great road from London to Liverpool, being 173 miles from the former, 30 from the latter, 24 from Chester, and 15 from Manchester. It was formerly a chapelry within the parish of Rothesme, but was made a distinct parish, by act of parliament, in the year 1741, and comprizes the townships of Over-Knutsford, Nether-Knutsford, Bexton, Ollerton, and Toft.

William de Tabley, who was lord of both the Knutsfords, about the year 1292, granted a charter of privileges to his burgesses of Knutsford, which is printed in Sir Peter Leicesters History of Bucklow hundred; this William, about the same time, procured a charter for a market on Saturday, which still continues, and a fair for three days, at the festival of St. Peter and St. Paul; the charter was confirmed to William Tabley the younger, 1332; this fair also is still continued; there is another on the 8th of Nov. and a third has been established within these few years on the 23d of April; none of them are noted as great marts for the sale of any particular commodities. A charter for a Wednesday's market at Over-Knutsford, on Knutsford-Booth, was granted in 1335, to Ellen Legh, with a fair on Tuesday and Wednesday in Whitfun-week; this market has been long discontinued, but the fair is still held.

Knutsford is not a corporate town, but it appears that its chief officer was called a mayor in the reign of King Edward I; it has now no peculiar government. The quarter-sessions for the county are held in this town at Midsummer and Michaelmas. In the year 1777, an account having been taken of the population of Knutsford, it was found that there were 375 families, and 1674 inhabitants; annual average of deaths for the ten years then preceding had been only one in forty, being about the same proportion as in the city of Chester, and very much below the usual average of towns. According to the returns made to parliament, under the population act in 1801, there were then 543 families in Over and Nether-Knutsford, and 2372 inhabitants, of whom 782 were employed in trade, manufactures, or handicraft. A manufacture of thread has been long established in this town. There is no cotton factory,

but a great deal of cotton spinning and weaving is done in private houses.

Under an act of parliament passed in the year 1741, Knutsford was made a distinct parish and vicarage, and the ancient chapel in Nether-Knutsford taken down; the new parish church, then built in the Tentry-croft, was consecrated in the year 1744, and dedicated to St. John the Baptist; the patronage is vested, by the act, in the lords of Over-Knutsford, Nether-Knutsford and Ollerton, Toft, and Bexton, who present in rotation. Knutsford is divided into two parts by a small rivulet, and from the relative situation, these divisions are called Upper and Lower. Annual races are held in the vicinity of this town. Immediately in the neighbourhood are some feats distinguished for their antiquity and picturesque features. To the north is Tatton-hall, the seat of Wilbraham Egerton, esq. a large stone mansion, recently erected from the designs of Samuel Wyatt, esq. The adjoining park comprizes about 2000 acres of land, some of which is annually in tillage. West of the town is Tabley-house, the seat of sir John F. Leicester, bart., a large brick mansion, in a spacious park, which is ornamented with a large lake and fine forest trees. The house is particularly noted for its noble gallery of pictures, all executed by English artists. Lysons's *Magna Britannia*, vol. ii. qto. 1810.

KNUTWEIL, a bailiwick of Switzerland, in the canton of Lucerne.

KNUTZEN, MATTHIAS, in *Biography*, a native of Oldenburgh, in the duchy of Slefwick, was educated at Konigsberg, in Prussia. He is the only person on record who openly professed and taught the principles of Atheism. It has been asserted that he had, at one time, 1000 disciples in the different parts of Germany. They assumed the title of "Conscientians;" because they maintained that people were bound to lay aside all consideration of God and religion, and to follow the dictates of reason and conscience alone. Reason, said Knutzen, teaches every man the three fundamental principles of the law of nature: "to hurt nobody"—"to live honestly"—and "to give to every man his due." In the year 1674, he dispersed a Latin letter, and two dialogues in German, explanatory of his doctrines, which assumed that there was neither God nor devil: that neither magistrates nor priests were to be regarded, and that there is no life but the present. Museums published an answer to his Letter and Dialogues, as well to refute the absurdity and wickedness of his system, as to contradict the fact respecting the number of the disciples. He probably died in contempt, as no notice is taken of the latter part of his life by historians. Moreri, Bayle.

KNUTZEN, MARTIN, a professor of philosophy in Prussia, was born at Konigsberg in the year 1713. He filled, for some years, the philosophical chair in the university of his native place, and occupied the post of librarian. He died in 1751, when he was only about thirty-eight years of age. He was author of several learned works, of which the principal are, "Systema Causarum Efficientium;" "Elementa Philosophicæ Rationalis, Methodo Mathematico demonstrata;" "Theoremata de Parabolis infinitis;" and "A Defence of the Christian Religion." This last is said to be a very excellent piece, and one that is honourable to his virtues and talents.

KNYSNA, in *Geography*, an arm of the sea on the coast of Africa, in the colony of the Cape of Good Hope, at the distance of about 13 miles to the westward of Plettenberg's bay, which, in the opinion of Mr. Barrow, may one day become an important situation. He has given a plan of it in the second volume of his "Travels in Southern Africa."

The tide sets into it through a narrow passage, or portal, as into a dock. The depth of water, and great extent of it, running into the centre of very fine forests, render it a most eligible place for building and repairing ships. Vessels of 500 tons and upwards, deeply laden, may pass the portal, and those that are much larger might be built in it and sent out light, to be completed in Plettenberg's bay. The forests contain several different kinds of durable and well-grown timber fit for that valuable purpose, as well as abundance of masts and yards.

KNYSZYN, a town of the duchy of Warfaw; 36 miles N. of Biellie.

KOADGWAH, a town of Hindoostan, in the circuit of Jenhat; 20 miles W.N.W. of Gujrat.

KOALA, in *Zoology*, a species of the *Wombat*, the peculiarities of which have been described by Mr. E. Home in the Phil. Transf. for 1803, part. ii. The koala inhabits the forests of New Holland, about 50 or 60 miles to the S.W. of Port Jackson, and was first brought to that place in August, 1803. It is commonly about two feet long and one high, in the girth about one and a half foot: it is covered with fine soft fur; lead-coloured on the back, and white on the belly; the ears are short, erect, and pointed; the eyes generally ruminating, sometimes fiery and menacing; resembling the bear in the fore part of its body; it has no tail; and its posture is commonly sitting. The New Hollanders eat the flesh of this animal, and are therefore diligent and active in the pursuit of it; ascending the loftiest gum trees, and following the animal from bough to bough, till at length they are able either to kill it with the tomahawk, or to take it alive. In the day time the koala feeds upon the tender shoots of the blue gum tree, and in the night it descends, and prowling about, scratches the ground in search of some particular roots. It seems to creep rather than walk; when incensed or hungry, it utters a long shrill yell, and assumes a fierce and menacing look. These animals are found in pairs, and the mother carries the young on its shoulders. The koala appears soon to form an attachment to the person who feeds it. These animals seem to form the intermediate link between the opossum and kangaroo. See WOMBAT.

KOAMAROO, CAPE, in *Geography*, the S.E. projection of land at the entrance of Queen Charlotte's Sound, on the island of Tavai-Poennamoo, one of the New Zealand islands. S. lat. 41° 34'. E. long. 176° 30'.

KOANG-TCHEOU, a town of Corea; 150 miles S. of King-ki-tao. N. lat. 35° 6'. E. long. 125° 41'.

KOB, in *Zoology*. See ANTELOPE *Lusiva*.

KOBA, in *Geography*, a town of Africa, in Kullo. N. lat. 12° 20'. W. long. 9°.—Also, a town of Arabia, in the province of Hedsjas; three miles N.W. of Medina.—Also, a town of Turkestan; 70 miles E. of Toucat.

KOBA of Buffon, in *Zoology*, *Antelope Koba*, is referred by Gmelin, with some hesitation, to ANTELOPE *Pygarga*, (which see); but Pennant refers the koba to the species we are now to describe; *i. e.* his Senegal antelope, the *Cervus temanaqama* of Seba, the antelope Bubalis of Pallas, la grande vache brune of Adanson. The horns are thick and annulated, very close at the roots, much bent in the middle, then approaching and receding at the ends, which are smooth, sharp, and bent backwards. This animal inhabits Senegal; it is a large species, seven feet long; the head is large and clumsy, with large ears, seven inches long; the horns are seventeen inches long, and are surrounded with fifteen prominent rings; the head and body are of a light reddish-brown colour, with a narrow black list down the hind part of the neck; the rump is dirty white; there is a dusky mark on each knee, and above each fetlock joint

the tail is about a foot long, and is covered with longish black hairs.

KOBACK, in *Geography*, a town of Slavonia, on the Save; 20 miles E.S.E. of Belgrade.—Also, a town of Africa, in the kingdom of Yani.

KOBAD, a district of Persia, in the N.W. part of Farsistan.

KOBAK, a town of Sweden, in West Bothnia; seven miles N.W. of Umea.

KOBAN KUPRI, a town of Turkish Armenia; 27 miles E. of Erzerum.

KOBELNIKA, a town of Austrian Poland, in Galicia; 34 miles W. of Lemberg.

KOBELWIES, a town in the canton of St. Gallen, in Switzerland, at the foot of the Kamor. About two miles above Kobelwies are the caves known by the name of the *Crystal Caves*. These are difficult of access, the only possible mode of entering them being in a creeping posture. From the first of these caves you descend into the second, and ascend again in order to arrive at the third, out of which issues a brook, which supplies forty baths at Kobelwies. The interior of the caves is fudded all over, not with rock crystals, but with calcareous spar, which is partly coated with a yellow kind of clay; it is found white and of an ashy-grey colour, separates into brilliant large grains with a smooth surface, and when burnt yields the finest and whitest sort of lime which is applied for the purposes of art. The water issuing out of the caves is very clear; it is impregnated with lime and sulphuric acid, and the baths it supplies (especially when taken warm) are very efficacious in the cure of the ague prevailing in the marshy parts of the country bordering on the Rhine.

KOBEN, a town of Silesia, in the principality of Glogau, on the Oder. N. lat. 51° 31'. E. long. 16° 26'.

KOBI, a town of Russia, in the government of Caucasus; 60 miles S.E. of Ekaterinograd.

KOBIELE, a town of Lithuania, in the palatinate of Troki; 20 miles N.N.E. of Grodno.

KOBIELEN, a town of the duchy of Warsaw; 28 miles W. of Kalish.

KOBIL, a town of Russia, in the government of Peterburg, on the E. coast of the Tschudzhoi lake; 24 miles N. of Pskov.

KOBILINKAIA, a town of Russia, in the country of the Cossacks; 156 miles E.N.E. of Azoph.

KOBIN, a town of Persia, in the province of Segellan; 30 miles S. of Zareg.

KOBINIKI, a town of Lithuania, in the palatinate of Wilna; 52 miles E.N.E. of Wilna.

KOBRESIA, in *Botany*, so called by professor Willdenow, in honour of a nobleman at Vienna, named de Kobres, whom he celebrates as an eminent promoter of natural history.—Willd. Sp. Pl. v. 4. 205.—Class and order, *Monocotyledon Triandria*. Nat. Ord. *Calamariæ*, Linn. *Cyperoideæ*, Juss.

Gen. Ch. Male, *Cal.* the inner scales of a catkin, each oblong, slightly concave, single-flowered, permanent, sometimes wanting. *Cor.* none. *Stam.* Filaments three, capillary, erect, longer than the calyx; anthers vertical, linear, erect.

Female, *Cal.* the outer scales of the same catkin, rather larger, sheathing, elliptic-oblong, single-flowered, permanent. *Cor.* none. *Pist.* Germen superior, triangular; style cylindrical, short; stigmas three, bristle-shaped; downy. *Peric.* none, except the permanent scales. *Seed* one, triangular, pointed, hard, naked.

Ess. Ch. Male, Calyx the inner scales of an imbricated catkin, solitary. Corolla none.

Female, Calyx the outer scales of the same catkin, sheathing, permanent. Corolla none. Stigmas three. Seed triangular, naked.

Obs. This genus differs from *Carex* in the want of a tunic to the seed, which is so remarkable in that, and has been called sometimes a corolla or nectary; as well as in the disposition of the flowers. These in *Kobresia* stand in pairs, the males being intersal, and smaller. In one known instance only they want their scale or calyx, so that there is no separation between the stamens and pistil, and the flowers become apparently united, or hermaphrodite. Three species only are known.

1. *K. stirpina*. Willd. n. 1. (*Carex* Bellardi; Allion. Pedem. v. 2. 264. t. 92. f. 2. Schkuhr. Car. 12. t. D. f. 16. C. myosuroides; Villars. Dauph. v. 2. 194. t. 6. See CAREX, n. 15.)—Spike solitary, simple, cylindrical.—Native of dry elevated spots on the mountains of Savoy, Dauphiny, Italy, Carinthia, Styria, and the Tyrol, flowering in July and August. We have gathered it high on Mount Cenis, in company with the able botanist whose name it bears. Linnæus had specimens from Italy, which he never described. Mr. Daval found this plant on the mountain of Valforey, though Haller has it not. The root is perennial, tufted, consisting of numerous blackish, zig-zag fibres, running deep into crevices of rocks. Stems numerous, a span high, or less, simple, naked, round, striated, smooth, erect or slightly curved, composing dense tufts, with numerous, sheathing, brown, polished radical scales, Leaves radical, erect, shorter than the stems, narrow, acute, involute, rough-edged. Spike terminal, solitary, erect, about an inch long, obtuse, slender, of from ten to twenty pair of flowers, most lax in its lower part. Glumes brown, shining, with membranous edges, awnless. Schkuhr figures but two stigmas; we find three, as all other writers describe them. The permanent glumes, investing the seed, look like the torn tunic of a *Carex*, as Villars represents them. That of the male flower is much the smallest and most membranous.

2. *K. caricina*. Willd. n. 2. (*Carex* hybrida; Schkuhr. Car. t. Rrr. f. 161. Willd. Schoenus monoicus; Sm. Eng. Bot. v. 20. t. 1410.)—Spike compound, dense, somewhat ovate; spikelets alternate, imbricated.—Native of Mount Cenis, in rather moist muddy spots, flowering in August; gathered by the writer of the present article in 1787. Mr. Dickson observed it in the county of Durlan in 1799. The Rev. Mr. Harriman mentions the mountain of Cronkley, and the neighbourhood of Widdy bank, in Teesdale forest, as its particular stations. At the suggestion of the late Mr. W. Brunton, it was referred in *Eng. Bot.* to *Schoenus*, proving, on examination, no *Carex*. Its habit and size are much like the preceding, except that the stems grow less crowded or tufted, and are stouter, and the leaves shorter, somewhat broader, as well as more spreading. The spike is essentially different, being composed of four or five alternate, short, elliptical spikelets, making all together an ovate figure. Glumes rather more pointed, keeled, and less membranous, than in the foregoing species. Stigmas three. Seed elliptic-oblong, triangular, pointed, horny.

3. *K. cyperina*. Willd. n. 3. (*Carex* hermaphrodita; Jacq. Coll. v. 4. 174. Ic. Rar. t. 615.)—Umbel twice compound, leafy; spikes cylindrical; spikelets spreading. Male flowers without their proper calyx.—Jacquin received this from the Caracæes, where it grows in wet situations, and it flowered with him in the stove at Vienna, from May to August. The habit is that of a *Cyperus*, or a *Kyllingia*. Root perennial. Stems annual, triangular, smooth, about two feet high, with several long, sheathing, linear, roughish leaves, half an inch broad at their base, and many smaller ones

ones at the *umbel*, which consists of numerous, simple, or compound stalks, bearing various thick but lax *spikes*. These are composed of numerous spikelets, spreading horizontally, each linear lanceolate, slender, a quarter of an inch long, and consisting of four or five, apparently hermaphrodite, imbricated *flowers*. It seems to us, however, that they are really *pairs of flowers*, of which the male wants the glume or calyx, which supposition is justified by the analogy of the other species. The colour of the whole plant is represented by Jacquin, as a nearly uniform pale green.—*Stigma* three. *Seed* oblong, triangular, pointed, brown. S.

KOBRYN, in *Geography*, a town of Lithuania, in the palatinate of Brzecz; 28 miles E. of Brzecz.

KOBYN, a town of Lithuania, in the palatinate of Brzecz; 34 miles E.S.E. of Brzecz.

KOCHEISKAYA, a town of Russia, in the government of Irkutsk, on the Ilga; 28 miles N.W. of Vercholenik.

KOCHIA, in *Botany*, so named by Dr. Roth, and adopted by Mr. R. Brown, in honour, as we presume, of a German botanist, John Frederick William Koch, author of a periodical work on economical plants, printed at Magdeburgh in 1797 and 1798, in octavo. It may also commemorate Joseph Matthias Koch, who published on agriculture at Vienna in 1767, recommending salt for manure; an opinion perhaps to be adopted "*cum grano salis*;" but as this plant belongs to a *saline* tribe, he may, under such limitation at least, be said to have merited the distinction as well as some professed botanists.—Brown Prodr. Nov. Holl. v. 1. 400.—Class and order, *Pentandria Dignia*. Nat. Ord. *Holeraceæ*, Linn. *Atriplices*, Juss. *Chenopodeæ*, Decandolle and Brown.

Eff. Ch. Calyx inferior, of one leaf, in five segments, having appendages at their backs when in fruit. Corolla none. Seed one, depressed, enclosed in the winged calyx.

Two species only are mentioned by Mr. Brown as natives of the south coast of New Holland.

1. *K. brevifolia*. Leaves cylindrical, sessile, smooth. Stem shrubby, much branched, erect and woolly. Appendages of the calyx dilated and membranous.

2. *K. aphylla*. Shrubby and leafless. Branches divaricate and bent downwards; the young ones spinous. Spikes lateral. Calyx woolly; its appendages when in fruit membranous.

There seem to be many more species in other parts of the world, as Mr. Brown advises a division of the genus into *Kochia*, properly so called, the species of which have the appendages of their calyx awl-shaped and spinous, their seeds destitute of albumen, and their embryo cloven at the base; and *Willemetia*, whose appendages are membranous and dilated, their seeds furnished sparingly with albumen. This difference however, respecting the albumen, in plants so nearly akin, shews how little any character is to be trusted absolutely. The absence or presence of albumen forms one of the most essential marks of distinction with writers on natural orders, and, on account of the difficulty of its detection, might seem more imposing and authoritative to the unlearned than it really is.

KOCNI, in *Geography*, a town of Walachia, on the Arégis; 15 miles N. of Bucharest.

KOCYCK, a town of Poland, in the palatinate of Lublin; 24 miles N. of Lublin.

KOCZARAWAC, a town of Poland, in the palatinate of Braclaw; 48 miles S.S.W. of Braclaw.

KOCZMYN, a town of Lithuania, in the palatinate of Novogrodek; 28 miles N. of Sluck.

KOCZOWA, a town of Poland, in the palatinate of Kiev; 22 miles S.S.E. of Bialacerkiev.

KODAJA, a town of Arabia, in the province of Nedsjed; 50 miles W. of Janama.

KODALLY, a town of Hindoostan, in Myfore; 27 miles E. of Chinna Balabaram.

KODDA-PAIL, in *Botany*, the Indian name of the Linnean *Pistia Stratiotes*. See Rheede Hort. Mal. v. xi. 63. t. 32, and Plum. Nov. Gen. 30. t. 39.

KODDE, VANDER, in *Biography*. There were three brothers of that name, *viz.* John, Adrian, and Gilbert, inhabitants of Warmond, near Leyden, who are entitled to notice from their having been founders of a religious community known by the name of COLLEGIANTS, which fees. The founders passed their days in the obscurity of a rural life, but were said to be men of eminent piety, well acquainted with sacred literature, and enemies to religious controversy. Gilbert was an elder of the Remonstrant church at Warmond, and possessed a fluent elocution. In the year 1619, when the persecution of the Calvinists had driven the Remonstrants from their churches, the three brothers proposed that meetings should be held of members of the church at Warmond, at which one or more of their number should read a chapter or two out of the Bible and pray; and if any person had any thing to offer by way of exhortation, instruction, or the edification of others, he should be at liberty so to do. Hence they soon inferred the utility of the ministerial profession, as the people were sufficiently qualified to teach and instruct one another. From this origin sprung a sect, or community, already referred to, consisting of persons of all sects which spread very widely over the Dutch provinces. Mosheim's Eccles. Hist.

KODEN, in *Geography*, a town of Lithuania, in the palatinate of Brzecz; 12 miles S. of Brzecz.

KODGIA-HISAR, a town of Asiatic Turkey, in the province of Diarbekir; 10 miles S. of Merdin.

KODGIA-SHEHR, a town of Natolia; 12 miles N. of Koutaja.

KODJAK, a range of islands, consisting of one large, bearing this name, and several smaller, in the North Pacific ocean, extending about 120 miles in length from S.W. to N.E., and about 40 miles in breadth; above 20 miles from the W. coast of America, and 30 S. from the entrance into Cooke's inlet. N. lat. 56 45' to 58 28'. E. long. 206° 12' to 208 45'.

KODJA. See the next article.

KODJAKANS, or KODJAS, a numerous class of persons in the Ottoman empire, particularly in the capital, which holds the middle rank between the military men and the lawyers, and which is become sufficiently powerful, since the influence of the Ulemas has declined, as the divan is composed of them, and as some of them obtain fees, military rank, and governments. Almost all the ministers, all the agents in the different administrations of the capital, the customs, and the mosques; all the principals of offices, all the secretaries, all the clerks, all the school-masters; in a word, all the writers from the simple "*kiatib*," who copies books, petitions, or memorials, and him who applies himself to writing purely and correctly the language, to the "*reis-effendi*," who is at the head of them, are all distinguished by the name of Kodja, and make part of that sort of corporation. The art of transcribing the national books, and especially the koran, is a kind of nursery for this class of persons. The Mussulmen are indebted to the Kodjas for a great number of works, which they hold in high estimation, relative to the Arabic and Persian languages, philosophy, morality, Mahometan history, and the geography of their provinces; and among them are generally found the most intelligent

statesmen, or those who are most capable of serving as ministers.

KODI-HISSAR, a town of Anatolia; 13 miles N of Kiugari.—Also, a town of Asiatic Turkey, in Aladulia, 18 miles N.E. of Sivas.

KODINSKA, a town of Russia, in the government of Tobolsk; 224 miles E. of Eniseik. N. lat. 58° 30'. E. long. 99° 14'.

KODMA, a town of Persia, in the province of Kerman; 40 miles N. of Kermandhir.

KODMANA, a town of Walachia; 10 miles S. of Kordecarda.

KODNIA, a town of Russian Poland, in Vollynia; 10 miles S. of Zytomiers.

KOEG. See DAGZUELLER.

KOEL, or KOEI-YANG, a city of China, of the first class, and capital of the province of Koei-tcheou. It is a small city, being only about three miles in circuit; its houses are partly of earth, and partly of brick, and as the river that approaches it is not navigable, it is a place of no trade. It was once the residence of the ancient kings; the remains of temples and palaces announce its former magnificence; but these monuments of grandeur are mouldering into ruins. Within its jurisdiction there are three towns of the second order, and four of the third; about it are many forts. N. lat. 26° 30'. E. long. 106° 19'.

KOEL-TCHEOU, the smallest province of China, bounded on the N. by Se-tchuen, on the E. by Hou-quang, on the S. by Quang-si, and on the W. by Yun-nan. The whole country is almost a desert, and covered with inaccessible mountains; so that it may be regarded as the Siberia of China. The inhabitants are independent and ferocious. The Mandarins and governors, who are sent into this province, are sometimes disgraced noblemen, for whom the emperor wishes to provide; the garrisons are entrusted to their charge, in order to overawe the country; but no troops of the empire are found sufficient to subdue the intractable mountaineers of this province. Many efforts have been made for this purpose, forts have been erected, and troops sent to conquer them; but they retire within the fastnesses of their mountains, and seldom issue forth, but to destroy the Chinese works, or ravage their lands. Neither silk stuffs, nor cotton cloths, are manufactured within this province; but it produces a plant, resembling our hemp, of which they make cloth for their summer dresses. It has mines of gold, silver, quicksilver, and copper; and of the last metal, they make those small pieces of coin, which are in circulation throughout the empire. This province contains 10 cities of the first class, Koei-yang being the capital, and 38 of the second and third. Some of these cities, which are constructed of earth and brick, and which may be said to resemble heaps of cottages, are situated on the banks of agreeable rivers and in fertile valleys; and though a quantity of land might be found in this province, which by proper cultivation would yield a considerable produce, the Chinese are so awed by the mountaineers, that they dare not leave the neighbourhood of their fortresses.

Koei-tcheou furnishes the best horses in China; an immense number of cows and hogs are raised here, and wild poultry, of a most exquisite taste, are every where to be found. Sir George Staunton estimates the population of this province at 9,000,000.

KOEL-TCHEOU, a city of China, of the first class, in the province of Se-tchuen; situated on the banks of the great river Kincha, or Yang-tse-kiang, and forming the key to the province with a custom house for receiving the duties of the merchandize which is brought thither. Its trade is great,

and of course it is opulent. Its jurisdiction comprehends one city of the second class, and nine of the third. The adjacent country is mountainous, but is rendered fruitful by the industry of its occupiers, who are unpolished husbandmen. The neighbourhood affords great quantities of musk, and several springs from which salt is procured. Orange and lemon trees are very common. N. lat. 31° 10'. E. long. 119° 14'.

KOELCOTTY, a town of Thibet, on the Ganges; 30 miles S. of Gangotri.

KOELF, a ridge of mountains between Sweden and Norway.

KOEL-PINIA, in *Botany*, so named by professor Pallas, in the third volume of his Russian Travels, p. 755. t. L. l. fig. 2, in memory of his "highly meritorious friend," Alexander Bernard Koelpin, Professor of Physic at Stetin, in Pomerania, author of several botanical tracts. Pallas submits this genus to the decision of those who, as he modestly says, take the lead in botany. Few are more worthy to do so than himself, and his *Koelpinia* is established as a genus by Schreber and Willdenow, though they found themselves obliged to adopt a different name, this identical genus being the *Rhagadiolus* of Cæsalpinus, Tournefort, Vaillant, Justieu, and Gartner, confounded by Linnæus under *Lapsana*. The name they have retained seems to us expressive and unexceptionable, though Ambrosini surely gives a wrong explanation of its meaning. See RHAGADIOLUS.

KOELREUTERIA, a genus named by Laxman, in the Memoirs of the Peterburg Academy, in honour of John Theophilus Kœreuter, M.D. professor of Natural History at Carlshue, born in the year 1733, author of some dissertations relative to the plants about Tubingen, and of several experiments relative to vegetable fecundation.—Laxman, in Nov. Comm. Petrop. v. 16. 561. t. 18. Schreb. 731. Willd. Sp. Pl. v. 2. 330. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 351. L'Herit. Sert. Angl. 18. Juss. 451. Lamarck. Illustr. t. 308.—Clafs and order, *Ocandria Monogynia*. Nat. Ord. *Tribilata*, Linn. *Sapindi*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five, ovate, obtuse, concave, membranaceous, unequal leaves, ascending towards the upper side, gaping below. *Cor.* Petals four, equal, ascending towards the upper side; the two lower ones opposite; claws cylindrical, straight, the length of the calyx; borders lanceolate, recurved at the top, spreading. Nectary composed of four erect, deeply cloven scales, affixed to the claws of the petals, forming a crown to the orifice; with three glands between the filaments and pistil. *Stam.* Filaments eight, awl-shaped, erect, affixed to the columnar receptacle; anthers oblong, obtuse. *Pist.* Germen superior, oblong, triangular, standing upon the columnar receptacle; style simple, three-sided, ascending, as long as the petals; stigma trifid, spreading, small. *Peric.* Capsule oblong, of three cells, and three valves, the partitions from their centre. *Seeds* in pairs, attached to the partition, one of them generally abortive.

Ess. Ch. Calyx of five leaves. Corolla of four petals, irregular. Nectary of four cloven scales, and three glands. Capsule of three cells, with two seeds in each.

1. *K. paniculata*. Willd. n. 1. L'Herit. Sert. Angl. t. 19. (*Sapindus chinensis*; Linn. Suppl. 228.)—A native of China, hardy with us, flowering in July and August. —*Stem* arboreous, upright, round, smooth, branched, six or seven feet high. *Branches* scattered, twined; the younger ones glandulous and dotted. *Buds* conical, imbricated. *Leaves* on long, club-shaped, channelled foot-stalks, unequally pinnate, with about six pair of ovate, lacinated, serrated,

rated, acute, flat leaflets. *Panicles* terminal, more than twice compound, loose and spreading. *Flowers* three or more on each partial stalk, greenish and in themselves not very conspicuous. Some male flowers being intermixed among the rest, have induced Schreber to refer the genus to *Polygonia*.

**KOEMPERIA.** See **KEMIFERIA.**

**KOENIG, SAMUEL,** in *Biography*, a learned philosopher, distinguished by his mathematical abilities, was a Swiss by birth. He filled the chair of philosophy and natural law in the university of Franeker, whence he removed to the Hague, where he had the appointment of librarian to the stadtholder, and to the prince of Orange. He was elected a member of the Academy of Sciences at Berlin, but was afterwards expelled from that body, on account of an attack upon Maupeituis the president, charging him with plagiarism. The learned in every part of Europe felt interested in the dispute. Koenig published an "Appeal" written with much animation, which procured him many supporters. He died in 1757, leaving behind him the character of being one of the best mathematicians of the age. He was author of several other pieces. According to Voltaire "he was a great metaphysician, a good geometriician, and, what is of still greater moment, a very good man."

**KOENIGIA,** in *Botany*, so called by Linnæus in honour of his disciple Dr. John Gerard Koenig, a native of Courland, born in 1728, who in 1765 discovered this plant in Iceland, and after having investigated the vegetable productions of that dreary country, and of its circumjacent seas, visited the richer climes of India, where he died at Jagrenatpou, in Bengal, in 1785. His communications have greatly enriched the collections of Europe, especially those of Linnæus, Retzius, and Sir Joseph Banks. The fine Banksian library contains his botanical manuscripts. His letters to Linnæus are very numerous and instructive.—*Linn. Mant.* 3. Schreb. 57. Willd. Sp. Pl. v. 1. 490. Mart. Mill. Dict. v. 3. Art. Hort. Kew. ed. 2. v. 1. 183. Juss. 83. Lamarck. Illust. t. 51. Gært. t. 128.—Class and order, *Triandria Trigynia.* Nat. Ord. *Holeraceæ*, Linn. *Polygonææ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, in three deep, ovate, concave, permanent segments. *Cor.* none. *Stam.* Filaments three, capillary, shorter than the calyx; anthers roundish. *Pist.* Germen superior, ovate; styles none; stigmas three (often but two), close together, downy, coloured. *Peric.* none. *Seed* solitary, ovate, as long as the calyx.

Eff. Ch. Calyx in three deep segments. Corolla none. Seed solitary, ovate, naked.

1. *K. Islandica.* Linn. Mant. 35. Fl. Dan. t. 418.—Native of Iceland, from whence Sir Joseph Banks brought seeds to Kew garden in 1773, and where Mr. William Jackson Hooker observed it on his late eventful visit to the same country, of which he has favoured the public with so pleasing and unaffected a narrative. This humble plant is chiefly calculated to attract the scientific botanist, being an annual, scarcely two inches high, with a few alternate, obovate, or spatulate, entire leaves, and small, green, fasciculate, terminal flowers. The whole herb is smooth, a little succulent, turning red in decay, or from exposure to much light, like its allies the tribe of Docks and Sorrels.

**KOERTEN, JOANNA,** in *Biography*, was born at Amsterdam in 1650. She had a fine taste for drawing in water colours and for embroidery. She also modelled in wax, and made artificial ornaments and flowers; but her chief excellence consisted in cutting out figures in paper with scissors only, and her portraits and landscapes in this way were so much

talked of that foreigners from all countries visited Amsterdam to see them, among whom was Peter the Great of Russia. She made a magnificent display of her art for the comfort of the emperor Leopold, consisting of trees, arms, eagles, &c. for which she was very handsomely paid. She died in 1715.

**KOETEKOIE,** in *Geography*, a small island in the East Indian sea. S. lat. 4° 38'. E. long. 132° 8'.

**KOEWAK,** a town on the S. coast of the island of Ceyram. S. lat. 3° 14'. E. long. 129° 18'.

**KOF,** a town of Japan, in the island of Niphon; 27 miles S.E. of Nigata.

**KOFEL,** a town of the county of Tyrol, on the borders of the Vicentin; near which is a celebrated pass, with a fort erected on a high and steep rock, in which is a spring of water for the supply of a small garrison, which can only enter by means of pulleys. The road below is scarcely wide enough for two carriages. On the side opposite to the fort is the precipitous bank of the Brenta; 21 miles E. of Trent.

**KOFEZ,** mountains of Persia, between Mecran and Kerman.

**KOGETIN,** a town of Moravia, in the circle of Olmutz; 14 miles S. of Olmutz. N. lat. 49° 20'. E. long. 17° 15'.

**KOGL,** a town of the duchy of Stiria; 17 miles N.N.W. of Rakepsurg.

**KOGONG,** a town of Africa, in the country of Sierra Leone. N. lat. 10° 45'. E. long. 12° 12'.

**KOHAUT,** a town of Candahar; 130 miles S.E. of Cabul. N. lat. 33° 5'. E. long. 70° 20'.

**KOHHEL,** a town of Arabia, in the province of Yemen; 10 miles N. of Dcbin.

**KOHLBERG,** a town of Bavaria, in the principality of Sulzbach; 11 miles N.E. of Sulzbach.

**KOHLMEISE,** in *Ornithology*, the *Colemouse* of Pennant, &c. See **PARUS ater.**

**KOHLMULEN,** in *Ichthyography*, a name given by some to the *asellus flavescens*, or yellow cod, called by others *blank* and *gelbe*. See **GADUS Pollachius.**

**KOHLRABI,** in *Agriculture*, the name of a sort of turnip cabbage, which is probably capable of being cultivated to advantage as an article of cattle food, though it is not yet much known to the farmers of this kingdom. It has the eatable part, or bulb, above the ground upon the stem, and there are two varieties, the green and the blue, which are both equally good and hardy in their nature.

In the raising of plants of this kind, the seed should be sown at the same period as for the common cabbage, and the plants, when of proper growth, be transplanted out in the same manner about the beginning of June, allowing good distances both between the plants and rows. In performing this work, it is advised to cut off about one-third of the roots of the plants, care being taken to plant them sufficiently deep in the ground, as by this means the bulb grows to a much larger size without becoming tough.

Plants of this sort succeed best on such soils as are not too much disposed to moisture. This plant is found to withstand the severity of frosts much better than the *Ruta baga*, or Swedish turnip. And it is further observed, that in the botanical garden at Brompton, some of the plants weighed seven or eight pounds; and that though many of them were notched and hacked on purpose for the experiment, the turnip remained perfectly sound and uninjured, while a bed of Swedish turnips near them was quite rotten. The faccharine quality of it is equally remarkable, and both its leaves and bulb are very useful as kitchen vegetables.

In our own trials, we found it to stand the severity of the winter without the least injury, and to be perfectly well tailed, though the bulbs did not increase to a large size. It has every appearance of being a variety of the turnip cabbage. But few experiments have, however, yet been made upon it, either in regard to its culture or application as a green cattle fodder.

KOHMU, in *Geography*, a town of Bengal; nine miles N. of Poree.

KOHOME, a town of Africa, in the kingdom of Burfali.

KOHTAUM, a town of Bengal; 18 miles W. of Doefa.

KOH-ZERDEH, mountains of Persia, in the province of Chufistan, bordering on the Irak. See HETZARDARA.

KOJA-KIZ, a town of Kharasim, near lake Aral; 18 miles N.E. of Urkonje.

KOIDANOW, a town of Russian Lithuania; 15 miles S.W. of Minfk.

KOJEND, or KOGEND, a town of Greater Bucharia, on the left bank of the Scir, on the borders of Turkellan. In 1220, it was taken and plundered by Jenghiz Khan, after a brave defence; 120 miles N.E. of Samarcand.

KOIRVIRAH, a town of Persian Armenia; 18 miles S. of Erivan.

KOISJU, a town of Japan, in the island of Ximo; 26 miles W. of Naka.

KOIVISTA, a town of Russia, in the government of Viborg; 20 miles S. of Viborg.

KOKANO, a town of Poland, in the palatinate of Bracław; 28 miles N. of Braclaw.

KOKAR, a small island of Sweden, in the Baltic, about 40 miles S.E. from the island of Aland. N. lat. 59° 58'. E. long. 20° 46'.

KOKERWARA, a town of Hindoostan, in Guzerat; 15 miles N.W. of Amedabad.

KOKETARRA, a town of Hindoostan, in the circar of Gangpou; 16 miles N.E. of Pada.

KOKLOT, a small island on the E. side of the gulf of Bothnia. N. lat. 62° 17'. E. long. 21° 25'.

KOKOB, in *Zoology*, the name of a species of serpent found in the West Indies, and very fatal by its bite. It is smaller than our viper, and of a brown colour, variegated with green and red spots.

KOKONOR, TARTARS OP, in *Geography*, a tribe of Tartars, who are, by nation, Eleuthes or Kalmucks, and subjects of the emperor of China, and who occupy an extensive country to the W. of China, and the province of Chen-si, from which they are separated by lofty mountains. See KALMUCKS.

KOKONOR, or *Kokonol Lake*, is the largest in Tartary; it is about 20 leagues in length, and 10 in breadth, and is situated between 36° 40' and 37° 10' N. lat. and 100° and 101° E. long.

KOKORE, a town of Hindoostan, in the circar of Kitchhara; 45 miles E.N.E. of Shajehanpou.

KOKORO, the eastern branch of the Senegal river, which rises about N. lat. 11° 50'. W. long. 6° 46', and joins the westerly branch about N. lat. 14°.

KOKORY, a town of Moravia, in the circle of Prerau; six miles N.W. of Prerau.

KOKRA, a town of Hindoostan, in the circar of Ruttunpou; 20 miles S. of Ruttunpou.

KOKURA, a sea-port town of Japan, on the N. coast of the island of Ximo; surrounded with walls, and having a citadel, it is a place of extensive trade, but the harbour is nearly choked with sand. N. lat. 33° 50'. E. long. 130° 20'.

KOLA, a sea-port town of Russia, in the government of Archangel, situated near the North sea, on the river Kola, forming a bay at its mouth, in which is a considerable fishery for whales, sea-dogs, and other fish, which the inhabitants cure for sale. N. lat. 68° 52'. E. long. 32° 26'. According to Mayer, it is 420 feet above the level of the sea. The thermometer was once, in May 1769, at 73°. —Also, a town of European Turkey, in Servia; five miles S. of Semenaria.—Also, a town of Turkish Armenia; 40 miles N.E. of Kars.

KALABOORA, a town of Hindoostan, in Orissa; 20 miles N.E. of Sumbulpour.

KOLAH, a town of Natolia; 36 miles N.E. of Alah-Sehr.

KOLAR, a town of Africa, in the kingdom of Burfali, near the coast of the Atlantic. N. lat. 13° 50'. W. long. 15° 55'.

KOLASSIN, a town of Dalmatia; 24 miles S.E. of Mostar.

KOLAY, a river of Cochinchina, which runs into the Chinese sea, N. lat. 13° 51'. E. long. 108° 54'.

KOLBE, or KOLBEN, PETER, in *Biography*, was born at Doufas, a village in the principality of Bairouth, of which place his father was a judge, and afterwards a receiver of taxes. When he had attained the first principles of knowledge, he was sent to Nuremberg to pursue his maturer studies. Here he lived some time in great poverty, being unknown, and having brought with him a single dollar only. In 1696, he was received into the house of Eimart, a great astronomer, under whose directions, and by whose aid, he made considerable progress in the sciences. He entered himself at the university of Halle in the year 1700, and in the following year he disputed "De Natura Cometarum," after which he gave a course of lectures in mathematics and philosophy. He was introduced to baron von Krosie, privy counsellor to his Prussian majesty, to whom he became secretary, and whom he accompanied in his travels. It being known that he had a great desire to visit foreign countries, a proposal was made to him to go to the Cape of Good Hope, which he gladly embraced. Here he remained ten years, making observations on the country and the people, till he was afflicted with the misfortune of blindness, which came on without any external injury. He now returned to Europe, and by means of medical assistance he so far recovered his sight as to be able to read with the assistance of glasses. In 1716, he inserted in the *Acta Eruditorum* a treatise "De aquis Capitis Bonæ Spei." This work introduced him into farther notice, and he was invited to travel with two Austrian counts, but his passion for foreign countries had subsided, and he preferred remaining at home, and taking upon himself the office of rector of the school of Neuladt. He discharged the duties of his situation with much diligence till the year 1726, when he died, in the fifty-second year of his age. His business, as an instructor, had not prevented him from publishing his great work, entitled "A Description of the Cape of Good Hope," in folio, with twenty-four plates. This work was translated into the Dutch language in 1727; and at London, into the English, in 1731. It was afterwards abridged, and published in French in three vols. 12mo. Kolbe has been charged with receiving information without much examination, and with having published, as true, many false and incredible stories; but when the proper deductions are made that severe criticism has suggested, there still remains much important information with regard to a country, which, at that time, was scarcely known. Gen. Biog.

**KOLBENDORF**, in *Geography*, a town of Bohemia, in the circle of Koniggratz; nine miles N.N.W. of Trauttau.

**KOLCHY**, a town of Poland, in the palatinate of Volhynia; 52 miles N. of Zytomyr.

**KOLEI-HISAR**, a town of Asiatic Turkey, in the government of Sivas; 45 miles N.E. of Sivas.

**KOLÉN**, a chain of mountains, extending between Norway and Swedish Lapland, and afterwards bending, in the form of a horse-shoe, on the S. of Finmark.

**KOLGAPARI**, a town of Russia, in the government of Olonetz; 80 miles N.N.W. of Olonetz.

**KOLIAKOV**, a town of Russia, in the government of Simbirsk, on the Sura; 80 miles W.S.W. of Simbirsk.

**KOLIAZIN**, a town of Russia, in the government of Tver, on the Volga; 68 miles E.N.E. of Tver.

**KOLIKUNDA**, a town of Africa, in the kingdom of Jenaraw.

**KOLIMA**, **KOLYMA**, or *Kovyma*, a river of Russia, which rises in the Stanovoi-Krchet, almost over-against Ochotk, and after receiving several other rivers, particularly the Omolon, forms a multitude of islands, and, by means of four broad arms, flows into the Frozen ocean, N. lat.  $71^{\circ} 25'$ . E. long.  $152^{\circ} 24'$ .

**KOLIN**, a town of Bohemia, in the circle of Kaurzim, on the Elbe; 30 miles E.S.E. of Prague. N. lat.  $49^{\circ} 58'$ . E. long.  $15^{\circ} 15'$ .

**KOLIVAN**, **KOLYVAN**, or *Kolyvan*, a city of Russia, and capital of the government of the same name, situated on the Oby, near the mouth of the Berda; known before the institution of this government under the name of "Berdskoi otdrog." Kolyvan is famous for the silver mines discovered in its vicinity. They lie between the rivers Oby and Irtysh, near the mountains which separate Siberia from the Chinese empire, or rather from the territory of Kalmucks dependent on the Chinese. They were discovered in the year 1725 or 1728, and appropriated to the crown by the empress Elizabeth in 1744. They produced annually, between 1749 and 1762, from 8000 to 16,000 pounds of silver; between 1763 and 1769, from 20,000 to 32,000; and since that period to 1778, from 40,000 to 48,000. The silver contains upwards of three *per cent.* of gold; the separation of which is made in the imperial laboratory at Petersburg. Upon the whole, it appears from the accounts of the board of mines, that they have produced, from their discovery to the year 1786, about 3,520,000 pounds of silver, and 48,000 pounds of gold, which yield, at an average, a produce of 50,000 pounds of silver, and 1600 pounds of gold *per annum*. The mines and foundries of Kolyvan employ nearly 40,000 colonists, besides the peasants in the districts of Tomsk and Kuznetz, who, in lieu of paying the poll-tax in money, cut wood, make charcoal, and transport the ores to the foundries. In the year 1765, a mint was established at the foundry of Sufunsk, for the coinage of the copper supplied from these mines, the greater part of which had been, till that period, of no use. Pieces of one, two, five, and ten copecks (the copeck being nearly equal to a halfpenny) are struck and dispersed over Siberia. Of this currency, the amount of 500,000 roubles is annually coined, which is sufficient for reimbursing the poll-tax, paying the miners, transporting the ore, purchasing the lead, which must be brought from Nerzhinsk, and defraying the expence of sending the gold and silver as far as Tobolsk. The silver melted in the foundries is conveyed on large sledges twice a year; the first convoy sets off in the beginning of winter, and reaches Petersburg a little after

Christmas; the second in the middle of winter, and arrives there towards spring. Kolyvan is distant 480 miles S.S.E. of Tobolsk. N. lat.  $54^{\circ} 20'$ . E. long.  $81^{\circ} 20'$ . Coxe's Travels in Russia, vol. iii.

**KOLIVAN**, *Kolyvan*, or *Kolyvan*, is also a government of Russia, bounded on the N. by the government of Tobolsk, on the E. by that of Irkutsk, on the S. by China, and on the W. by Tartary; about 720 miles in length, and from 240 to 360 in breadth. This government was formerly included in that of Tobolsk; it contains five districts, viz. Kolyvan, Semipalat, Birk, Kufnez, and Krasnoiarik.

**KOLIVAN**, or *Kolyvan*, is also the name of a range of mountains, constituting the principal part of the Altay mountains, or the proper ore-mountains of Altay. (See **ALTAY**.) The Kolyvan-vos-krefenskoï mountains derive their appellation from the adjacent lake Kolyvan, which has given its name to the whole chain between the Irtysh and Oby, as well as to the government, and from the first copper-mine, called Volkrefenskoï. These mountains are bounded on the S. by the granitic ridge, which parts them from the **KORBO-lilinkoi**, which see. They are confined to the E. by the deep valley in which the line of the present fire-poets is drawn, and by the lofty Tigaretzkoi snow-mountains; and bounded on the N. by the river Tiharysh, whose course is accompanied by considerable high schist and chalk mountains; towards the W. they lose themselves in the north-western Steppe. The greatest elevation of these mountains is the Simaia-fopka, or Blue-mountain, which is computed to ascend 2814 Parisian feet above the level of the sea. At the middle and greatest height, this range consists of a molty coarse granite, composed of Spatum compacte, quartz, and blackish mica. In the angle formed by the little Biela with the great Biela, at the foot of the Blue mountain, are found schistus and chalk-stone, in which latter are some little cavities, containing lapis calcareus stalaçites. From the little Biela the mountains rise again toward the south, elevating themselves to the Revennaia-fopka, or Rhapsodii fummut, which is surrounded by the ore-mountains, and consisting of schistus corneus, mixed sparingly with mica sphatola and crumbs of mica campestris, in which latter are a few small hollows, in which are found stalaçites. Towards the west, from the Blue mountain, runs the granite-mountain range, in bulk from 15 to 30 versts, interrupted by a multitude of valleys, proceeding 100 versts to the Alay, and there uniting with the Alaikoi granite-hills. The northern foot of this granite-ridge runs under powerful schistus and chalk mountains, in and between which the two first Kolyvan mines were dug. Another mighty ridge of granite runs from the Blue mountain northwards to the river Tiharysh, under-run on the western side by schistus and chalk. The component parts of these granite ridges are various. In some parts the feldspar, in others the quartz, has the ascendancy. In one place the component parts are coarse, and then so delicate and so poor in mica, that one might be induced to take the granite proceeding from them for sand-stone. This tract of mountains is uncommonly rich in silver, copper, and zinc ores. Tooke's Russia, vol. i.

**KOLKI**, a town of Poland, in the palatinate of Volhynia; 22 miles N.N.E. of Lucko.

**KOLKOTOVATOL**, an island in the Caspian sea, near the W. coast. N. lat.  $44^{\circ} 45'$ .

**KOLLAT**, a town of European Turkey, in Bulgaria; 72 miles E.S.E. of Driltra.

**KOLLOW**. See **KILLOW**.

KOLLUVI, a country of Africa, between Aſben and Cathna, inhabited by the Tuarick.

KOLLYRITE. Under this name an argillaceous foſſil is mentioned in Karſten's Mineralogical Tables, which is found at Strehani-Schlacht, near Schemnitz. Dr. Townſon, we ſuppoſe, is one of the firſt naturaliſts who obſerved it there. This mineral ſubſtance, which was firſt conſidered as pure alumine, is light, very friable, and ſnow-white; it ſoils the fingers, and adheres ſtrongly to the tongue, which laſt property has procured it the name of *kollyrite* (from *kol'yris* of Dioſcorides and Pliny.) According to Klaproth's analysis of the Hungarian kollyrite, it conſiſts of

Alumine	45
Silica	14
Water	41

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100

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This ſubſtance, which may be conſidered as a purer variety of clay, has alſo been found, by Frieſleben, at Weiſſenfels, in Thuringia, in a ſtratum of ſand-ftone.

According to Brongniart, it has a tolerable degree of tenacity, and the water it abſorbed is ſeen to ooze out on the application of preſſure, but it retains the liquid with ſuch force, that more than a month is required to dry even a ſmall quantity of it. By defecation, it ſeparates into baſaltic priſms, like ſtarch, loſes half of its weight, and becomes very light.

KOLMOGOR, in *Geography*, a diſtrict of the government of Archangel, ſituated on the Dwina.

KOLNO, a town of the duchy of Warſaw; 80 miles N.E. of Warſaw.—Alſo, a town of Lithuania, in the palatinate of Brzeſc; 88 miles E. of Pinfk.

KOLO, a lake of Ruſſia, in the government of Archangel; 28 miles S. of Archangel.—Alſo, a town of the duchy of Warſaw; 24 miles N.E. of Kalifch.

KOLOCKEN, a town of the duchy of Courland; 32 miles N.E. of Pilten.

KOLOGRIN, a town of Ruſſia, in the government of Koſtroma, on the river Unza; 116 miles N.E. of Koſtroma. N. lat. 58° 55'. E. long. 44° 14'.

KOLOMNA MOSEVA, a town of Ruſſia, and diſtrict of the government of Moſcow, about five verſts from its junction with the Occa; the ſee of a biſhop; 48 miles S.E. of Moſcow. This town is reckoned to contain about 60,000 inhabitants.

KOLONEI, a town of Auſtrian Poland, in Galicia, on the Pruth; 86 miles S.S.E. of Lemberg.

KOLOR, a town of Africa, in the kingdom of Woollis; 20 miles E.N.E. of Medina.

KOLOSVAR. See COLOSVAR.

KOLOZ, a town of Tranſylvania; 14 miles S.S.E. of Hunyad.

KOLPAK, a town of European Turkey, in Beſſarabia; 40 miles W. of Akerman.

KOLSKOI, a town of Ruſſia, in the government of Archangel, on the E. ſide of the Dwina; 96 miles S.S.E. of Archangel.

KOLTER, one of the Faroer iſlands.

KOLTYNIANY, a town of Lithuania, in the palatinate of Wilna; 32 miles E. of Wilkomierz.—Alſo, a town of Samogitia; 28 miles N.W. of Roſienne.

KOLVEREID, a town of Norway; 95 miles N.N.E. of Drontheim.

KOLUMBATZ, a town of European Turkey, in Macedonia; 68 miles N. of Akrida.

KOLZUM, or COLSUM, anciently *Olyſma*, (which ſee,) a town of Egypt, which formerly exiſted near the E. coaſt of the Red ſea, but the ſea has long ſince left the coaſt; and the town has been deſtroyed. From Volney we learn, that the name is ſtill attached to a hillock of ſand, bricks, and ſtones, on the coaſt of the Red ſea, about 300 paces to the N. of Suez: whereas D'Anville places it 16 miles S. of Suez.

KOM, or KHUM, a large and populous city of Perſia, in the province of Irak, at the foot of high mountains, and near a conſiderable river, which is loſt in the great ſalt deſert. When Chardin viſited it, the houſes were computed at 15,000; and the chief manufactures were white earthen ware, ſoap, and ſword-blades, ſabres, and poniards. The walls are lofty, and the town has ſeven gates. The public ſquares are ſmall; the grand bazar croſſes the town from one gate to the other; and there are others, which are furniſhed with coffee-houſes, and ſhops of various kinds. Here are a celebrated moſque, and an aſylum for debtors, who are protected and ſupported. One of the moſques is highly eſteemed by the Perſians, on account of the ſepulchres of ſhah Seſi I. and ſhah Abbas II., and alſo that of Sidy Fatima, grand-daughter of Mahomet. Theſe tombs are frequented by pilgrims from all parts of Perſia, who reſort hither once a year to pay their devotions, and are ſupported by a fund assigned to this purpoſe. The city is governed by a viſier, and is the reſidence of a khan. The adjacent country is fertile in rice and fruit; 150 miles N. of Iſpahan. N. lat. 34° 20'. E. long. 51° 14'.

KOMA, a town of Lithuania, in the palatinate of Wilna; 42 miles S. of Braſlaw.—Alſo, a town of Perſia, in the province of Khorafan; 227 miles N.N.E. of Herat.

KOMANA, in *Botany*, an arbitrary name given by Adanſon to *Hypericum monogynum* of other authors, which he eſtabliſhes as a genus, on account of its ſolitary ſtyle. Juſſieu, however, asserts that this ſuppoſed ſimple ſtyle is compoſed of five, cloſely united. The capsule is deſcribed as of one cell, but we have never ſeen it at all advancing towards maturity, ſo as to form an opinion on the ſubject. See HYPERICUM and KNIFA.

KOMANA, in *Geography*, a town and abbey of Walachia; 18 miles S. of Buchareit.—Alſo, a diſtrict of Africa, on the Slave coaſt.

KOMANGO, or AMANGO, one of the Friendly iſles; 5 miles E. of Annamooka.

KOMARA, a town of Hindooſtan, in Myfore; 65 miles E.N.E. of Harponelly.

KOMARNA, a town of Auſtrian Poland, in Galicia; 24 miles S.S.W. of Lemberg.

KOMBAH, a town of Africa, in the country of Gago; 170 miles E. of Kaffaba. N. lat. 11° 25'. E. long. 2° 30'.

KOMBO, a kingdom of Africa, near the Atlantic, S. of the Gambia.

KOMBREGUDU, or COMBREGO-ADOU, a kingdom of Africa, ſituated on the banks of the river Falemi, about N. lat. 13° 10'. W. long. 10°.

KOMCHA, or KOMSILA, a decayed town of Perſia, in the province of Irak, celebrated for its gardens and dove-houſes, and degraded by the bad character of its inhabitants; 39 miles S. of Iſpahan.

KOMENTING, the name of two towns in the iſland of Borneo; one 45 miles N. and the other 15 miles S.S.W. of Negara.

KOMMANICK, in *Ornithology*, the German name for the large-crested lark, common in many parts of Germany, but not known in England. See ALAUDA *criſtata*.

KOMOL,

KOMOL, or COMOL, in *Geography*, a sea-port town of Nubia, with a small but safe harbour in the Red sea. N. lat.  $22^{\circ} 45'$ . E. long.  $35^{\circ} 15'$ .

KOMRI, A. L., a mountainous ridge in the interior part of Africa, called also the "Mountains of the Moon," terminating the country of Donga. N. lat. 7.

KONAPOUR, a town of Hindoostan, in the country of Sajoire; 50 miles E.N.E. of Goa. N. lat.  $15^{\circ} 45'$ . E. long.  $74^{\circ} 32'$ .

KONDOZ, a town of the Greater Bucharja; 60 miles N.W. of Anderab. N. lat.  $36^{\circ} 50'$ . E. long.  $67^{\circ} 22'$ .

KONDRA, a town of Bengal; 36 miles S.W. of Docha.

KONDUR, a town of Hindoostan, in Dowlatabad; 100 miles S.E. of Aurungabad. N. lat.  $18^{\circ} 54'$ . E. long.  $77^{\circ} 30'$ .

KONEVETZ, a small island of Russia, in lake Ladoga; 60 miles N.N.E. of Petersburg.

KONEZKOI, a town of Russia, in the government of Vologda, on the Vm; 56 miles N.E. of Yarenk.

KONG. See G. N. JAH.

KONGA, a town of Africa, in the kingdom of Loango.

KONG-FORS, a town of Sweden, in Welt Bothnia; 16 miles N.W. of Umea.

KONGHELL, KONGSHELE, or *Kong-elf*, a town of Sweden, in the province of Welt Gothland, on an island in the Gotha; formerly the capital of Norway, and residence of kings, but now decayed; 10 miles N. of Gotheburg.

KONGBACKA, a sea-port town of Sweden, in Halland; 13 miles S. of Gotheburg. N. lat.  $57^{\circ} 30'$ . E. long.  $12^{\circ} 56'$ .

KONGBERG, or CONISBERG, a town of Norway, celebrated for its silver mines. It stretches on both sides the river Lowe, which, in its course through the town, falls in a series of small but picturesque cataracts over the bare rocks. The crags which border the town are in some parts naked, in others clothed with wood, and intermixed occasionally with slips of corn and pasture; nevertheless, the prominent features of the circumjacent scenery are ruggedness and horror. Kongberg contains about 1000 houses, including those of the miners, and 6000 inhabitants. The mines are distant from the town two miles. They were discovered and opened during the reign of Christian IV. Thirty-six mines, says Coxo, are now working; the deepest is 652 feet perpendicular. The matrix of the ore is the *Jaxum* of Linnæus; the silver is extracted according to the usual process, either by smelting the ore with lead, or by pounding. Pure silver is occasionally found in small grains, and in small pieces of different sizes, seldom weighing more than four or five pounds. One mass has been found which weighed 429 marks, and was worth 3000 rix-dollars (600*l.*); this piece is preserved in the cabinet of curiosities at Copenhagen. Formerly these mines produced annually 70,000*l.*; in 1769, 79,000*l.*; at present, (says Mr. Coxo) they yield only from 50,000*l.* to 54,000*l.* The expences, it is said, generally equal, and sometimes exceed the profits. The largest piece of money struck at Kongberg is only eight skillings, or four-pence.

KONGSWINGER, a town of Norway, in the province of Christiania; 42 miles N.E. of Christiania. N. lat.  $60^{\circ} 12'$ . E. long.  $12^{\circ} 8'$ .

KONG-TCHANG, a city of China, of the first class, in the province of Chen-si, seated on the banks of the river Hooi, and surrounded by very high mountains. This city is very populous, and has great trade. A tomb is shown here, which the Chinese pretend to be that of Fo-hi. The jurisdiction of this city extends over three others of the se-

cond class and seven of the third. N. lat.  $34^{\circ} 56'$ . E. long.  $104^{\circ} 19'$ .

KONI, a town of Imiretta; 30 miles S.W. of Co-tatis.

KONJADA, *Gros*, and *Klein*, two towns of Prussia, in the palatinate of Culm; the former 12 miles N.N.W. of Straßburg; and the latter 14 miles.

KONIAWA, a town of Lithuania, in the palatinate of Troki; 36 miles N.E. of Grodno.

KONIECPOLE, a town of Poland, in the palatinate of Bracław; 60 miles S.E. of Bracław.

KONIGINGRATZ, or KRALOWE HRADECZ, a city of Bohemia, and capital of a circle of the same name, seated on the Elbe, built in the year 782, and the see of a bishop, under the archbishop of Prague; 58 miles E. of Prague. N. lat.  $50^{\circ} 10'$ . E. long.  $15^{\circ} 39'$ .

KONIGSBERG, a large and beautiful city and sea-port of Prussia, situated on the river Pregal, which has seven bridges; founded in 1255, rebuilt in another situation in 1264, and well fortified in 1526, by a rampart about seven English miles in circumference. The rampart incloses the gardens, the large cattle moat, with some meadows and fields. The number of houses is about 3800, and of inhabitants about 60,000. This city properly consists of three towns that are joined together; *viz.* Altstadt, Lobenicht, and Kneiphof, and of several suburbs. Altstadt, or the old town, contains 16 streets, and 550 houses, of which more than 100 are malt-houses and brew-houses. It is embellished with six gates, two strong-built towers, and four bridges. Lobenicht, built about the year 1300, was formerly called Neustadt, or the new town. Kneiphof is the most modern, as it was founded in 1324. This stands on an island formed by the river Pregal, the buildings of which are erected on piles of alder-trees, which by length of time are become as hard as iron. It has five large gates, and 13 streets. The cathedral of this town has a famous organ, which consists of 5000 pipes, and was finished in 1721. The university was founded, in 1544, by the margrave Albert, and has 38 professors, exclusive of the tutors. The number of students in 1802 was 300. The town-house is a fine building, where the magistrates of the three towns, which were incorporated in 1724, meet every day. The strong citadel, called "Fredericksbürg," was built in 1657, and directly faces Kneiphof, at the conflux of the two branches of the Pregal. This fort is a regular square, surrounded with broad ditches and the river Pregal, which is here increased by the canal or dyke, called "Kupferteeich." In the citadel are a church and an arsenal. Kongberg has always ranked high in commerce and shipping, and was formerly one of the Hans towns. Its trade is still flourishing, by means of the river Pregal, which is here navigable, and from 120 to 240 feet in breadth. In 1752, 493 large ships, and 373 floats of timber, arrived in this port, besides smaller vessels. A colony of French Calvinists excepted, the inhabitants of Kongberg are chiefly Germans of the Lutheran persuasion. In 1758, this city was taken by the Russians, and in 1807 by the French. N. lat.  $54^{\circ} 43'$ . E. long.  $20^{\circ} 38'$ .

KONIGSBERG, or *Klinkowice*, a town of Silesia, in the principality of Troppau; 13 miles S.E. of Troppau. N. lat.  $49^{\circ} 40'$ . E. long.  $18^{\circ} 10'$ .

KONIGSBERG, a town of Brandenburg, in the New Mark; 24 miles N.N.W. of Culstrim. N. lat.  $53^{\circ} 2'$ . E. long.  $14^{\circ} 33'$ .—Allo, a town of Germany, in the principality of Coburg, situated on the side of a mountain, on which is an ancient castle; 20 miles S.S.W. of Coburg. N. lat.  $50^{\circ} 4'$ . E. long.  $10^{\circ} 45'$ .

**KONIGSBRONN**, a town and convent of Wurtemberg; 20 miles N.N.E. of Ulm.

**KONIGSEGG**, a principality of Germany, comprehending Konigsegg-Rothenfels, and Konigsegg-Aulendorf. The former possesses the county of Rothenfels and lordship of Stauffers; and the latter the county of Konigsegg, and lordship of Aulendorf. The lordship of Konigsegg confists only of an ancient castle, 8 miles N.W. of Ravensburg, and a few hamlets.

**KONIGSEK**, a town of Bohemia, in the circle of Böhlin; 10 miles E.S.E. of Neuhaus.

**KONIGSFELD**, a town and citadel of the duchy of Berg; 26 miles S.S.E. of Cologne.—Also, a town of Bavaria, in the bishopric of Bamberg, on the Auffses; 10 miles N.E. of Bamberg.

**KONIGSFELDEN**, a bailiwick of Switzerland, in the canton of Berne, situated between the town of Bruck and the river Reufs. The monastery of this place, belonging to the monks of St. Francis and the nuns of St. Claire, founded in commemoration of the death of the emperor Albert, who was assassinated in 1308 by his nephew John, duke of Swabia, became very rich by grants from the house of Austria, and other nobility.

**KONIGSHEIM**, a town of Germany, in the county of Wertheim; 14 miles S. of Wertheim.

**KONIGSHOF**, a town of Bohemia, in the circle of Königgratz; 14 miles N. of Königgratz.

**KONIGSHOFEN**, a town of the duchy of Wurzburg, on the Tauber; 20 miles S.S.W. of Wurzburg.—Also, a town of the duchy of Wurzburg, on the Saal; 38 miles N.E. of Wurzburg. N. lat. 50° 12'. E. long. 10° 27'.

**KONIGSLUTTER**, a town of Westphalia, in the principality of Wolfenbuttel, situated on a stream, called the "Lutter;" 12 miles N.E. of Wolfenbuttel. N. lat. 52° 17'. E. long. 10° 56'.

**KONIGSTEIN**, a town of Germany, and capital of a county of the same name, with a castle built on a rock; 11 miles N.W. of Francfort on the Maine.—Also, a town of Bavaria, in the principality of Sulzbach, near Sulzbach.—Also, a fortress of Norway, in the diocese of Christiania, built for the defence of Frederickstad.—Also, a town of Saxony, in the margraviate of Meissen, situated on the left side of the Elbe, with manufactures of linen and woollen. It is situated on a mountain, and rendered, as it was supposed, impregnable. It is accessible only in one place, and supplied with water from a very deep spring in the mountain; 16 miles S.E. of Dresden.

**KONIGSTUHL**, *i. e.* King's Chair, a head-land on the N.E. coast of the island of Usedom, in the Baltic. N. lat. 54° 37'. E. long. 13° 58'.

**KONIGSWALD**, a town of Bohemia, in the circle of Leitmeritz; 13 miles N.N.W. of Leitmeritz.

**KONIGSWALDE**, a town of Brandenburg, in the New Mark; 22 miles E. of Cultrin. N. lat. 52° 25'. E. long. 15° 26'.

**KONIGSWERT**, a town of Bohemia, in the circle of Pilsen; 12 miles W.N.W. of Topel.

**KONIN**, a town of the duchy of Warfaw; 20 miles N. of Kalisch. N. lat. 52° 6'. E. long. 18° 15'.

**KONINCK**, or **KONING**, **DAVID DE**, in *Biography*, a painter of birds, animals, and still life. He acquired the principles and executive powers of the art under the tuition of John Fytt; whose jealousy is said to have been excited by the praises bestowed upon his disciple.

On this account De Koninck left him, and travelled to

Italy, from Antwerp, where he was born. He arrived in Rome in 1668, having refused engagements to paint upon his journey, offered him by the dukes of Bavaria and the court of Vienna. In Rome he was highly honoured. Balduino, who lived at the time, speaks of him as employed by the greatest among the nobles there; and receiving commissions from foreign kings and sovereign princes.

His works and manner resemble those of Fytt, with whom, on his return to Antwerp, he was a constant competitor. But he is not so perfect, his effects are not so brilliant, nor is his touch so free. He died in 1687: his age is not known.

**KONINCK**, or **KONING**, **PHILIP DE**, a portrait painter, who, having studied in the school of Rembrandt, proceeded in his course with great success, obtaining in early life a good reputation, and maintaining it in the great number of pictures which he produced. His style is, necessarily, almost an imitation of that of his master. It is too fascinating for a man that had once obtained possession of the court to quit it easily. His likenesses were esteemed, and he had great choice and variety of attitude. He is among the number of those whose portraits are honoured with a place in the gallery at Florence. He died in 1689, at the advanced age of 70.

**KONINGH**, **SOLOMON**, a portrait and historic painter of the Flemish school. He was the disciple of Vernando and Moojart, and rose to a certain degree of eminence, but not among the first class.

**KONIT**, or **CONIT**. Professors Retzius and Schumacher describe under this name a calcareo-siliceous rock of a whitish-grey, or white colour, found in Norway, Iceland, &c. It has only been seen in detached pieces, most of which bear the marks of being rolled. It is faintly glimmering; in some pieces its lustre approaches to the vitreous, and even the unctuous lustre. Its fracture is uneven, flat conchoidal, sometimes obsoletely foliated, sometimes even and splintery, not unlike that of some varieties of horn-stone. The fragments are indeterminately angular. The varieties having an unctuous lustre, and obsoletely foliated fracture, are translucent at the edges. Its hardness is far superior to that of common compact limestone, and it even strikes fire with the steel. It is not easily frangible. Specific gravity 2.8. When reduced to powder, and thrown on burning charcoal, it emits a greenish light, but it is not phosphorescent from friction. It effervesces with diluted nitric acid, and is partly dissolved in it: the remainder is siliceous earth.

The proportion of the calcareous and siliceous earth, of which the konit consists, is not yet ascertained.

Upon the whole, we know too little of this mineral substance to assign it its proper place in the system. Häuy refers it, with a query, to his quartz-agathe calcifere, which is the silicealce of Saussure. See Häuy and Brongn. vol. i. p. 325.

The specimens of conite described by Schumacher were from Iceland; the one which we had an opportunity of examining came from Kenrudvern, near Dramen, in Norway.

Among the many new names which a modern writer on rocks is desirous of palming upon the world, we have also that of *konite*, which, without mentioning that it has been previously given to a different rock, he applies to the variety of compact lime-stone, called *freestone*.

**KONITZ**, in *Geography*, a town of Germany, in the county of Schwartzburg-Rudolstadt; where are mines of silver and copper; 6 miles E.S.E. of Rudolstadt.—Also, a baili.

a bailiwick of Switzerland, in the canton of Berne.—Also, a town of Moravia, in the circle of Olmutz; 15 miles W. of Olmutz.—Also, a town of Prussia, in Pomerelia; 8 miles E. of Schlockaw.

KONKODOO, a country of Africa, bounded on the N. by Bambouk, on the E. by Gadou, on the S. by Worada and Jallonkadoo, and on the W. by Satadoo; about 60 miles from N. to S., and 40 from E. to W. N. lat. 12° 10' to 13° 10'. W. long. 9 to 10°.

KONN, a town on the N. coast of the ifle of Timor. S. lat. 8 18'. E. long. 126° 16'.

KONNARUS, a name given by Agathocles in Athens to a plant of Arabia, which the description fhews to be the fame with the *faduc* of the later Arabians, the fruit of which is called *nabac* or *nabech*. See CONNARUS.

This tree is the lotus of Dioscorides, and the acanthus of Virgil, whose berries he mentions. The fruit of this tree is like a cherry, but smaller, and is ground to powder by the Africans when dried. It is very well known to all who are acquainted with the writings of the old physicians, that the berries of the lotus or nabac were ground down, by the Egyptians and other nations where they grew, to a fine powder for medicinal uses. They were astringents, and used both externally in poultices and fomentations, and internally in decoctions and other forms where astringents were required.

KONNO, in *Geography*, a town of Japan, in the island of Niphon; 70 miles N.W. of Meaco.

KONOE, one of the Faroer islands; 2 miles N. of Bardoe.

KONOS, a town of Asiatic Turkey, in Natolia; 20 miles N.E. of Degenizlu.

KONOTOP, a town of Russia, and district of the government of Novogorod Sieverskoi, seated on a rivulet falling into the Seim. N. lat. 51° 5'. E. long. 33° 34'.

KONSAN, a town of Africa, in the country of Sierra Leone. N. lat. 10° 44'. W. long. 12° 15'.

KONSBERG. See KONGSBERG.

KONSTANTINGRAD, a town of Russia, in the government of Ekaterinoflav, on the borders of Turkey. N. lat. 49° 15'. E. long. 34° 52'.

KONTOP, a town of Silesia, in the principality of Glogau; 15 miles E. of Grunzberg.

KOOCH, a town of Hindoostan, in the country of Agra; 60 miles E. of Gwalior. N. lat. 26°. E. long. 79 35'.

KOOHANGAN, a small island in the Sooloo Archipelago. N. lat. 6 3'. E. long. 121° 18'.

KOOJAR, a town of Africa, in the country of Woulli; 54 miles E. of Medina.

KOOLASSIAH, a small island in the Sooloo Archipelago. N. lat. 6 22'. E. long. 120° 38'.

KOOLBARY, a town of Hindoostan, in Golconda; 35 miles S. of Combarot.

KOOLIKORRO, a town of Africa, in the kingdom of Bambarra, on the Niger; which is a great salt-market; 130 miles S.W. of Sego.

KOOLUCONDA, a town of Hindoostan, in Myfore; 13 miles N.E. of Nagamungalum.

KOOMAR, a town of Hindoostan, in Bahar; 13 miles E.N.E. of Bahar.

KOOMBOO, a town of Africa, in the kingdom of Tenda. N. lat. 12° 42'. W. long. 12°.

KOOND, a town of Hindoostan, in Bahar; 17 miles N. of Saferam.

KOONDA, a circar of Bengal, bounded on the N.E. by Bahar, on the E. by Rangur, on the S. by Toree, and on

the W. by Palamow; about 25 miles long, and 16 broad; the capital is Koonda; 92 miles S. of Patna. N. lat. 24° 11'. E. long. 84° 48'.

KOONI, a town of Japan, in the island of Niphon; 30 miles N. of Tomu.

KOONIAKARY, a town of Africa, in the country of Woulli; 48 miles E.N.E. of Medina.—Also, a town of Africa, in Kaffon. N. lat. 14° 36'. W. long. 8° 58'.

KOONJOOR, a circar of Hindoostan, in Orissa, between Gangpur and Mohurunge, the capital of which, of the same name, is 86 miles N.N.W. of Cattaek.

KOONKA, a town of Bengal; 25 miles W.S.W. of Rangur.

KOONTI, in *Hindoo Mythological History*, is the mother of three of the five Pandus, whose wars are related in the *Mababarats*; which see. See also PANDU.

KOORBAH, in *Geography*, a town of Hindoostan, in the circar of Ruttunpur; 20 miles E. of Ruttunpur.

KOORGUNGE, a town of Bengal; 22 miles E. of Boghrpur.

KOORKARANY, a town of Africa, in Bondou; 50 miles W. of Fatteconda.

KOORNHERT, THIEDORF, in *Biography*, descended from a respectable family at Amsterdani, was born in the year 1522. He was brought up to the profession of an engraver, which he soon abandoned, to travel into Spain and Portugal, but on his return home, an imprudent marriage forced him to take up the graver at Harlem, to support himself and wife. His leisure hours he employed in reading and improving his mind in various ways, in the hope that knowledge might fit him for a better employment than that in which he was labouring. We accordingly find him admitted a notary in 1561, and in the following year he was appointed secretary to the city of Harlem, and in 1564 he was made secretary to the burgo-masters of that city. In this character he was frequently sent to the prince of Orange, governor of Holland, with whom, and with other persons of consequence, he consulted respecting the means of maintaining the liberty of his country. Through him, the famous petition of the Confederates was presented to the dukes of Parma in 1566. He was also the author of the first manifesto which the prince of Orange published in his camp, intitled "An Advertisement to the Inhabitants of the Low Countries for the Law, the King, and for the Flock." The part which he took in politics excited against him the resentment of the government of Brussels, by whose directions he was sent to the Hague, where he suffered a long and cruel imprisonment. He at length obtained a hearing, and, successfully vindicating himself, he was set at liberty; but he found it necessary to withdraw from the power of his enemies, and went to the county of Cleves, where he again maintained himself by his profession as an engraver. When, in the year 1572, the States of Holland had taken the resolution to assert their liberty against the tyranny of the Spaniards, Koornhert returned to his own country, and was appointed secretary to the states of the province; finding, however, the people prejudiced against him, for avowedly vindicating the principles of toleration in respect to the Roman Catholics, he resigned his post, and withdrew to Embden. It does not appear that he was a Catholic himself, but he formed the project of uniting all persons of all sects, by way of *interim*, till God should be pleased to raise reformers, in all respects like the apostles. His plan being, that only the text of God's words should be read to the people without comment or explication, and without prescribing any commandment, or prohibition, but at most by way of advice. In 1578, he returned to Holland, where

was engaged in a controversy with two ministers of Delft at Leyden, concerning the characteristics of the true church. He soon proved too powerful for his antagonists, who charged him with the design of making a schism among the people, and who obtained an order that he should not be permitted to publish any thing in print concerning the dispute. He was also forbidden to trouble the ministers of Delft with letters, or otherwise, upon pain of the utmost severity. Being thus effectually silenced, the ministers in different towns of Holland directed their attacks against him from the pulpit, representing him, by name, as a heretic, an impious fellow, and a free-thinker. He petitioned to be heard in his own defence, but was refused, and ordered to comport himself peaceably and dutifully, in which case he should be secure from danger. This he regarded as the introduction of a new inquisition, or force upon consciences in Holland. Koonhert was ever, and at all times, the consistent friend to liberty of conscience, and the firm opponent to whatever could abridge the right of free discussion; for his zeal and intrepidity in this cause, he was continually harassed by bigots and the government of the country: he had, however, a mind that could not be subdued, and he made use of his pen, in various tracts, to vindicate the principles which he espoused. Among his other literary antagonists was the celebrated Lipsius, who, in a treatise on civil government, maintained that only one kind of religion should be tolerated in one state, and that persons who held different opinions, and who endeavoured to bring others over to their party, ought to be punished. "Mercy," says the professor, "has no place here, caustics and amputations must be made use of, it being better that one limb should perish than the whole body." In answer to these persecuting tenets, Koonhert published his treatise, intitled "The Process, or Trial of Heretic-killing, and Force upon Conscience," which he dedicated to the magistratés of Leyden. These, however, to gratify Lipsius, gave notice officially, that they did not accept the dedication, and that the author had, by it, done them neither service nor honour. Koonhert died at Gouda in 1590, in the 68th year of his age. Grotius expressed a high esteem for his character, and an ardent hope that his judicious labours would be useful to his country and the world. He is classed by Pontanus among the learned men of the city of Amsterdam, and as one warmly attached to the interests of piety and truth. Hadrian Janinius, in his description of Holland, calls him a man of divine understanding: he adds, that Fortune was his enemy, and he thinks that he suffered himself to be made use of by God "as a voluntary demolisher of the murdering prison of consciences." An edition of all his works was published in 1630, in three volumes folio. Bayle. Gen. Biog.

**KOOROO**, in *Geography*, a town of Africa, in the country of Fouta. N. lat. 10° S. W. long. 10° 20'.

**KOORTA**, a town of Bengal; 35 miles W. of Nagore.

**KOORUMBAH**, a town of Hindoostan, in Dowlatabad; 40 miles E. of Poorunder.

**KOORWEY**, a town of Hindoostan, in the route from Agra to Oojein, connected with another town called "Baraf," on the banks of the Betwa. These towns are of considerable size, and at the former is a large stone-fort. They are inhabited by Patans, who settled here about 100 years ago, in the time of Aurungzebe. The revenue of the present Nawab is said to be between one and two lacs of rupees, which is sequestered for the payment of a debt to the Mahrattas.

**KOOS**, a town of Japan, in the island of Niphon; 45 miles S. E. of Jessen.—Also, a town in the island of Ximo; 36 miles E. S. E. of Udo.

**KOOSAMBO**, a town on the N. coast of the island of Bali. S. lat. 8° 24'. E. long. 114° 46'.

**KOOSHAUB**, a town of Hindoostan, in the subah of Lahore, on the Behut; 95 miles W. of Lahore. N. lat. 31° 45'. E. long. 71° 5'.

**KOOSHINJEE**, or **PUSHING**, a town of Candahar; 80 miles S. E. of Candahar. N. lat. 32° 14'. E. long. 66° 58'.

**KOOTACONDA**, a town of Africa, in Woolli; 16 miles W. S. W. of Medina.

**KOOTAKOO**, a town of Africa, in Fooladoo. N. lat. 13° 30'. W. long. 7° 40'.

**KOOTY**, a town of Hindoostan, in Bahar; 84 miles S. S. W. of Patna. N. lat. 24° 23'. E. long. 84° 43'.

**KOPACZOW**, a town of Poland, in the palatinate of Braclaw; 72 miles N. W. of Braclaw.

**KOPAN**, a town of Hungary; 18 miles W. S. W. of Symontornya.

**KOPANITZ**, a town of Selavonia; 21 miles S. S. W. of Eszek.

**KOPASH**, a town of Dagestan; 45 miles N. W. of Derbend.

**KOPIGOWKA**, a town of Poland, in the palatinate of Braclaw, on the Bog; 16 miles S. W. of Braclaw.

**KOPIL**, a town of Lithuania, in the palatinate of Novogrodek; 45 miles S. E. of Novogrodek.

**KOPIN**, a town of Poland, in Podolia; 28 miles N. of Kaminiac.

**KOPOLET**, a sea-port of the principality of Gurick, on the Black sea. N. lat. 41° 35'. E. long. 41° 22'.

**KOPORE**, a town of Russia, in the gulf of Finland; 32 miles W. of Petersburg.

**KOPYL**, a town of Lithuania, in Novogrodek; 16 miles N. W. of Sluck.

**KOPYSS**, a town of Russia, and district of the government of Mohilef, situated on the Dnieper.

**KORA**, a town of Russia, in the government of Irkutsk, on the Ilga; 36 miles N. W. of Vercholenk.—Also, a town of Africa, in the kingdom of Jemarror.

**KORACHORYNCHUS INDICUS**, in *Ichthyology*, the name of a sea-fish of the East Indies, called by the Dutch the *raevenbeck*. It has its name from its nose resembling the beak of a raven or crow, and is about seven inches long; its back and tail are red, and its belly yellow; it has also, on each side, two pale yellow longitudinal lines, running from the gills to the tail. It is a wholesome and well-tasted fish. Ray.

**KORALLEN-ERTZ**, *i. e.* *Coral-Ore*, a name given by the miners of Idria, in Friaul, to a variety of bituminous shale, with tuberculated shining surface, and containing much hepatic and some other mercurial ores. See *MERCURY*.

**KORAMO**, or **CURAMO**, in *Geography*, a town of Africa, in the kingdom of Benin.

**KORAN**. See *ALCORAN*.

**KORASAN**, or **CHORASAN**, a province of Persia, terminating it in the N. E. is bounded on the N. by Charafin and the country of the Usbeck Tartars, on the N. E. by the Gihon or Oxus, on the E. by Bucharia and Candahar, on the S. by Segestan and the lake of Zeré, or Zurra, the Aria palus of antiquity, and on the W. by the province of Mazanderan and the Caspian sea; about 450 miles in length and 420 in breadth. This country formerly comprehended Margiana in the north and Ariana in the south. It was conquered by Timur Bec in the year 1396, and granted by him to his son Mirza Charoe, together with Mazanderan and Segestan. The principal towns are Herat, Kenef, Talekan, Merwah, Zaweh, &c.

**KORBETH**,

**KORBETH**, a town of Persia, in Irak; 126 miles S. of Hamadan.

**KORBI-LA-HOU**, a town of Africa, on the Ivory Coast.

**KORBOLE**, a town of Sweden, in Hellingland; 53 miles W.N.W. of Hudwiskfall.

**KORBOLIKINSKOI MOUNTAIN**, a mountain of Russia, part of the range of *Kolván* (which see), which has its name from the brook Korholikha, which runs through it. It is enclosed from the S., E., and W., by granite mountains; but on the N.E. is bounded by the great Biela, together with schist and chalk mountains. It consists, except in some few points, which are covered with sea-bottom materials, for the most part of clay, schist, marl-wacke, lapis corneus, and quartz, here and there underlain by granite and porphyry. Although the height of these mountains, between the origin of the Korholikha and the little Biela, is considerable, yet the mountain on the great Biela, such as the Revennaia Sopka, and the Karaulnaia-Sopka, remarkably distinguish themselves on account of their single summits. The mineral of this mountain consists of a schistose marl-wacke and horn-schist, in which here and there hornblende and crumbs of feldspar are to be met with. The chain of mountains, in conjunction with the north-western and south-eastern rivers of the Revennaia-Sopka, the Blue mountain, and the Kolhyvan granite mountain, and in the south-east, after they have encompassed the *klitsheski* majak, terminate at the foot of high granitic snow mountains. The Revennaia-Sopka is the highest point of these mountains, being estimated at 2213 Parisian feet higher than the Slangenberg; it is said not to consist of granite, but of firm horn-schistous. In this Korholikinkoi tract of mountains, the richest of all the Altay mine-works are carried on. See **KOLIVAN** and **ALTAI**.

**KORCHELLEN**, a town of the duchy of Warfaw; 52 miles N. of Warfaw.

**KORCHINO**, a town of Russia, in the government of Nizgorod; 80 miles S.S.W. of Niznei Novgorod.

**KORCK**, a town of Norway, in the diocese of Drontheim; nine miles S.W. of Romidal.

**KORCZANY**, a town of Samogitia; 24 miles W.N.W. of Miedniki.

**KORCZICK**, a town of Poland, in Volhynia; 15 miles N.E. of Ostrog.

**KORDEDEARDA**, a town of European Turkey, in Walachia; 80 miles N.W. of Bucharest. N. lat. 45° 15'. E. long. 24 24'.

**KORDOFAN**, a country of Africa, between Dar-Für and Sennaar, subject to the sultan of Dar-Für, by whom it was conquered in 1795. Mr. Brown informs us in his "Travels in Africa, Egypt, and Syria," that an inveterate animosity subsists between the natives of Dar-Für and those of Kordofan; inasmuch that wars have been almost continual between the two countries, as far as the memories of individuals extend. One of the causes of this hostility appears to be their relative position; the latter lying in the road between Dar-Für and Sennaar, which is considered as the most practicable, though not the direct communication between the former and Mecca. Nor can caravans pass from Suakem to Für, unless by the permission of the governors of Kordofan. The jealousy of trade is, therefore, in part the origin of their unvaried and implacable animosity. A king, of the name of "Abli-Calik," is the idol of the people of Kordofan, where he reigned some years ago, and was renowned for probity and justice. The kings of Kordofan had been deputed by the meque of Sennaar, till after the death of the son of Abli-Calik, when it was usurped by

Für, in consequence of the weakness and dissensions of the government at Sennaar. The people of Kordofan are reported to be not only indifferent to the amours of their daughters and sisters, but even attached to their seducers. The father or brother will even draw the sword against him who offends the "Refik," or companion of his daughter or sister. Kordofan extends from N. lat. 12° to 14° 40', and from E. long. 20° 25' to 32° 30'.

**KORDYN**, a town of Poland, in the palatinate of Kiev; 44 miles W.S.W. of Kiev.

**KOREPSKOI**, a cape on the N. coast of Russia, in the North Sea; 124 miles N.W. of Archangel.

**KORIAKI**, an oligo of Kamtschatka, on the Awatka; 27 miles W. of Awatika.

**KORIAKS**, the denomination of a people who inhabit the northern parts of the Penhsinkoi gulf, and of the peninsula of Kamtschatka, near and among the Kamtschadales, Tunguses, Lamutes, and Tschukthes. They are supposed to derive their name from the word *Kora*, which in their language signifies a rein-deer. The great likeness they bear to many islands of the Eastern ocean, and to the nearest Americans beyond the Strait, afford reason for supposing that they, and also the Tschukthes, are the primitive possessors of these coasts; who either came over from the continent of America, or were separated from it by the probable infractions of the sea, and the consequent division of the two quarters of the world. With respect to number they are about equal to the Kamtschadales, who, according to the enumeration of 1760, amounted to about 3000 males, though it is not unreasonable to conclude, that their number is in reality three or four times larger. According to Lesslepe the Koriaks are supposed not to exceed 2000 families. These people are divided into two classes, *viz.* the wandering and the fixed Koriaks. The latter inhabit the northern part of the isthmus of Kamtschatka, and the whole coast of the eastern ocean, from thence to the Anadyr. The country of the former stretches along the N.E. of the sea of Ochotik, to the river Penskina, and westward towards the river Koyoma. The fixed Koriaks have a strong resemblance to the Kamtschadales; and, like them, depend altogether on fishing for subsistence. Their dress and habitations are of the same kind. They are tributary to the Russians, and under the district of the Ingiga. The wandering Koriaks occupy themselves entirely in breeding and pasturing deer, of which they are said to possess immense numbers; so that it is not unusual for a single chief to have a herd of 4 or 5000. They despise fish, and live altogether on deer. They have no balagans, and their only habitations are like the Kamtschadale jouts, with this difference, that they are covered with raw deer-skins in winter, and tanned ones in summer. Their sledges are drawn by deer, and never by dogs; which, like the latter, are always spayed, in order to be trained to this business. The draft deer pasture in common with the others; and when they are wanted, the herdsman makes use of a certain cry, which they instantly obey, by coming out of the herd. Captain King was informed by the priest of Paratouca, that the two nations of the Koriaks and the Tschutiki speak different dialects of the same language; and that it does not bear the least resemblance to the Kamtschadale. According to the account of Lesslepe, the manners of the fixed Koriaks are a composition of duplicity, mistrust, and avarice; and they are said to have all the vices of the northern nations of Asia, without the virtues. Robbers by nature, they are suspicious, cruel, and incapable either of pity or benevolence. Perfidious and savage in their disposition, they are in a state of

perpetual hostility with their neighbours; and hence every individual is led to cherish a ferocious spirit. Hence also they acquire an inflexible courage, and glory in a contempt of life. Superstition also imposes upon them a law which obliges them to conquer or to die. The vicinity of the Russian settlements has hitherto produced no change in the mode of life of the resident Koriaks. Their commercial intercourse with the Russians merely seem to render them more avaricious and more addicted to plunder; and they resist every attempt of civilization. The wandering Koriaks were for a long time more intractable. Their regular occupation is hunting and fishing, and when the season does not allow of their pursuing it, they sleep and smoke, and indulge themselves in drunkenness. Their passion for strong liquors has led them to invent a drink, equally powerful with brandy, which is scarce and dear, and which they extract from a red mushroom, known in Russia as a strong poison, under the name of "moukhamorr." With a preparation of this they entertain their guests for one, two, or three days, till their stock is exhausted. The features of a majority of the Koriaks are not Asiatic; but they might be considered as Europeans, if it were not for their low stature, ill shape, and the colour of their skin. Others of them have the same characteristic outlines with those of the Kamtschadades. Among the women particularly, there are very few who have not sunk eyes, flat noses, and prominent cheeks: the men are almost wholly destitute of beards, and have short hair. The women carry their children in a sort of arched basket, in which the infant is placed in a sitting posture, and sheltered from the weather. When a Koriak dies, his relations assemble, erect a funeral pile, and place a portion of the wealth of the deceased, and a stock of provisions, consisting of rein-deer, fish, brandy, and whatever else they conceive will be wanted by him for his journey, and prevent his starving in the other world. The body is exhibited in his best attire, and lying in a kind of coffin; and after receiving the adieu of his attendants, who have torches in their hands, they hasten to reduce it to ashes. They wear no mourning, as they feel only the regret of a temporary absence, and not of an eternal separation; and the funeral pomp generally terminates in the intemperate use of liquor and tobacco. Death is regarded by them as a passage to another life, in which other joys are reserved for them. They acknowledge a supreme being, the creator of all things, whose residence is the sun; but they neither fear nor worship him. Goodness, they say, is his essence; and it is impossible, as all good proceeds from him, that he should do any injury. The principle of evil they consider as a malignant spirit, who divides with the sovereign good being the empire of nature. To this evil spirit they pay respect, and perform their devotion, in order to pacify his wrath, and to avert the calamities which he inflicts. Accordingly they offer him, as expiatory sacrifices, various animals that have begun to exist: rein deer, dogs, the first fruits of their hunting and fishing, and the most valuable of their possessions. Supplications and thanksgiving constitute their devotional exercises. His votaries have no temple nor sanctuary. This imaginary god is worshipped in all places; and they conceive that he hears their prayers in the solitude of the desert, as well as in society; and that he is rendered propitious by their indulging to drunkenness in their jouts: for, strange as it may seem, drunkenness is among these people a religious practice, and the basis of all their solemnities. See KAMTSCHATKA and TSCHEUTSKI.

**KORKAN**, or **JORJAN**, a flat district on the east side of the Caspian sea, subject to great heat, frequent inundations, and an unwholesome air; but the soil is fertile, and produces dates, wine, cotton, silk, and corn.

**KORKINA**, a town of Russia, in the government of Tobolsk; 20 miles S.W. of Iselim.

**KORKUB**, a town of Persia, in Chufitan; 30 miles W.S.W. of Jondifabur.

**KORMAND**, a town of Hungary, on the Raab; 52 miles S. of Vienna.

**KORMESHTY**, mountains of Ireland, in the county of Mayo; 17 miles N.W. of Castlebar.

**KORMUDSEH**, a town of Persia, in the Farfistan; 100 miles S.W. of Schiras. N. lat. 28 37'.

**KORNBURG**, a town of Sturia, on the Raab; 24 miles S.E. of Graz.

**KORN DYCKT**, a small island of Holland, in the Meuse, with a town of the same name; about 7 miles W.N.W. of Willemstadt.

**KORN-NEUBURG**, a town of Austria, on the north side of the Danube, opposite to Closter-Neuburg; 8 miles N. of Vienna. N. lat. 48° 19'. E. long. 16 40'.

**KORNOCK**, an island near the west coast of West Greenland. N. lat. 61° 38'. W. long. 47° 40'.

**KOROL**, a town of Hindoostan, in Guzerat; 20 miles E. of Baroch.

**KOROLOVETZ**, one of the eleven districts of the government of Novogorod Severkoi in Russia, situated on a rivulet falling into the Defna; 40 miles S.E. of Novogorod Severkoi.

**KOROMANTEES**, a general appellation given in the British West Indies to most of the negroes purchased on the Gold Coast, from *Koromantyn*, one of the earliest of our factories on this part of the African coast; which is now become an insignificant village, or factory, in possession of the Dutch. It is situated in the kingdom of Fantyn, two miles from the fort of Anamaboe. The Koromantyn or Gold Coast negroes are distinguished from all others by firmness both of body and mind, a ferociousness of disposition, and, at the same time, activity, courage, and a kind of stubbornness, which prompts them to enterprises of difficulty and danger, and enables them to meet death, in its most dreadful forms, with fortitude or indifference. Many of them had been slaves in Africa, and others had been engaged in perpetual hostility with one another; and they were, therefore, prepared for endeavouring, even by means the most desperate, to regain the freedom of which they had been deprived. Accordingly they have been disposed to excite or to encourage rebellion. This was the case in Jamaica in the year 1760. The firmness, and intrepidity, and contempt of death, which are distinguishable in adults, brought from the Gold Coast, are visible even in boys at the age of ten years. Edw. W. Indies, vol. ii.

**KOROP**, a town of Russia, and district of the government of Novogorod Severkoi, seated on the left shore of the Defna.

**KOROROFAH**, a country of Africa, situated east of Wangara.

**KOROTCHA**, a town of Russia, and district of the government of Kurik, seated on a rivulet of the same name, that falls into the Donetz; 44 miles E.S.E. of Kurik.

**KOROTOIAN**, a town of Russia, and district of the government of Voronez, situated on the Don; 20 miles S. of Voronez.

**KOROVA**, a small island in the sea of Ochotik; 240 miles E. of Ochotik. N. lat. 59° 20'. E. long. 150° 40'.

**KORPIKYLÄ**, a town of Sweden, in West Bothnia; 14 miles N.N.W. of Tornea.

**KORPLAX**, a town of Sweden, in Tavastland; 68 miles N.N.E. of Tavasthus.

**KORPO**, an island of Sweden, in the Baltic, near the

fourth-west coast of Finland, of an oval form, about 20 miles in circuit; having on the north-west coast a town of the same name, and several villages. N. lat. 60° 9'. E. long. 21° 25'.

KORPONA, a town of Hungary; 28 miles N.N.E. of Grau.

KORS, a town of Persia, in the province of Adirbeizan; 80 miles S.S.E. of Erivan.

KORSA, a town of Hindoostan, in the subah of Delhi; 26 miles W. of Delli.

KORSAKI, or CORSAC, in *Zoology*. See Fox.

KORSEK, in *Geography*, a town of Poland, in Volhynia; 32 miles E. of Lucko.

KORSENIÉC, a town of Lithuania; 60 miles E. of Wilna.

KORSEWALAN, a small island in the East Indian sea. S. lat. 7° 39'. E. long. 128° 40'.

KORSNÄS, a town of Sweden, in East Bothnia; 25 miles S.S.E. of Wafa.

KORSÖER, a fortified town of Denmark, lying at the mouth of a small bay, forming a well-protected harbour, on the Great Belt. It has a few good houses, which belong to merchants, &c. Some trade is carried on from hence up the Baltic, and in the vicinity. The fortifications are in ruins, and the town is chiefly inhabited by fishermen and seafaring people. The breadth of the Great Belt between Korsöer and Nyeborg is about 22 miles.

KORSUN, a town of Poland, in the palatinate of Kiev; 44 miles S.S.E. of Biala-cerkiev.

KORSZANY, a town of Samogitia; 25 miles N.W. of Midiki.

KORTCHERA, or KORTCHEF, a town of Russia, and district of the government of Tver, on the Volga.

KORTHOLT, CHRISTIAN, in *Biography*, a native of Holstein, was born at Burg, in the isle of Femen, in the year 1633. Having acquired the rudiments of learning, he was, at the age of sixteen, sent to Sleswick, where he pursued his studies two years; and from this place he went to the college of Steutin, made great proficiency in learning, and obtained high applause by the able manner in which he maintained two theses. He continued his literary studies at Rostock, to which place he removed in 1652; and afterwards he delivered lectures, in his own apartments, on logic, metaphysics, and Hebrew. In 1656 he took his degree of doctor in philosophy, after which he went to study at the university of Jena, where he distinguished himself by his academical acts, and by his private lectures on philosophy, the oriental languages, and divinity. In 1661 he went to the court of Schwerin, at the invitation of the duke of Mecklenburg, in whose presence, as well as in the presence of a great number of the nobility, he disputed two days on theological topics with two learned Roman Catholics, one an Austrian, and the other a Pole; and on a similar invitation he disputed, in the following year, with a Roman Catholic of Paris. On these occasions he acquired universal applause from the auditors. In 1662 he was nominated to the chair of the Greek professor at Rostock, and took his degree of doctor of divinity. From thence he removed to Kiel, became second professor of divinity, and afterwards vice-chancellor and first divinity professor. In 1680 the duke of Holstein bestowed upon him the professorship of ecclesiastical antiquities, and, in 1689, declared him vice-chancellor for life. Five times he had the honour of being nominated vice-rector at Kiel; and it is universally allowed that he performed the duties of his various posts with great ability and perseverance. He died in the year 1694, at the age of sixty-one, much respected and honoured by his friends

and the university of Kiel. To the republic of letters he had been an ornament by a number of curious, learned, and useful works; the titles of which are given in Moreri, and also in Bayle, to which the reader is referred for further information.

KORTISJARVE, in *Geography*, a town of Sweden, in the province of Wafa; 43 miles E.N.E. of Wafa.

KORTRICHT, a post-town of America, in Delaware county, New York, in which are 1513 inhabitants.

KORTSCHIN, a town of Poland, in the palatinate of Sandmirz; 40 miles S.W. of Sandmirz.

KORTY, a town of Africa, in Sennaar, on the borders of the Nile, where the caravans quit the river, and turn to the Desert, in order to avoid the pirates of the Nile; 60 miles E. of Dongolu.

KORYSOWA, a town of Poland, in the palatinate of the Kiev; 32 miles S.W. of Kiev.

KORZÉCZOW, a town of Poland, in the palatinate of Sandmirz; 24 miles S. of Sandmirz.

KORZELLAN, a town of the duchy of Warlaw; 70 miles N.W. of Warlaw.

KORZYMECK, a town of Poland, in the palatinate of Lublin; 38 miles N.N.E. of Lublin.

KOS, in the *Jewish Antiquities*, a measure which held the quantity of four cubic inches, and something over. This was the cup of blessing, out of which they drank when they gave thanks after solemn meals, as on the day of the passover.

KOSA, in *Geography*, a town of Russia, in the government of Perm; 48 miles W. of Solikamsk.

KOSARIA, in *Botany*, Forsk. *Egyptiaco-Arab.* 164. Ic. t. 20. A latecent fetid very singular plant, found by Forskall in the coffee plantations at Hadie. Jussieu, on the authority of Niebuhr, refers it to *Dorstenia*, and it is *D. radiata* of Willdenow, Sp. Pl. v. i. 683. *Kosar* is its Arabic name. The stem is thick and fleshy, like that of some African *Euphorbia*, bearing on the upper part several oblong, jagged, stalked leaves. The flowers have a radiated common receptacle, and grow on stalks, from tubercles at the sides of the stem. The plant bruised is applied as a cure for eruptive disorders.

KOSCEA, in *Geography*, a town of Walachia; 16 miles N. of Kimmik.

KOSCIABAD, a town of Persia, in the province of Kerman; 60 miles S.W. of Sirjian.

KOSCLOW, a town of Austrian Poland, in Galicia; 60 miles E. of Lemberg.

KOSEL, a town of the county of Tyrol, on the Brenta; 21 miles E. of Trent.

KOSHA, in *Zoology*. See *Siberian Dog*.

KOSHAB, in *Geography*, a town of Curdistan; 20 miles S. of Van.

KOSHANIA, a town of Great Bucharia; 30 miles W. of Samarand.

KOSHANIKUT, a town of Persia, in the province of Segeftan; 110 miles N.E. of Bost.

KOSKANUADEGO, a river of Pennsylvania, which runs into the Alleghany, N. lat. 41° 52'. W. long. 79° 20'.

KOSKIN, a town of Norwegian Lapland; 108 miles S.W. of Pofanger.

KOSKIS, a town of Sweden, in Tavastland; 22 miles E. of Tavasthus.—Also, a town of Sweden, in the government of Abo; 20 miles E.N.E. of Abo.

KOSL, a town of Arabia, in the province of Yemen; 18 miles W.N.W. of Chamir.

KOSLOF, a town of Russia, and district of the government

ment of Tanbof, on the rivulet Ufnoi Voronetz; 48 miles N.W. of Tanbof.

KOSOLULI, a town of European Turkey, in Bessarabia; 28 miles N.N.W. of Bender.

KOSREUKEN, a town of Natolia; 16 miles N.W. of Kiutaja.

KOSSAR, a town of Poland, in Volhynia; 28 miles W.N.W. of Lucko.

KOSSATZ, a town of Bohemia, in the circle of Koniggratz; 12 miles W. of Koniggratz.

KOSSOW, a town of Lithuania, in the palatinate of Novogrodek; 56 miles S.S.W. of Novogrodek.

KOST, a town of Great Bucharia; 70 miles S.S.E. of Balk.

KOSTEL, a town of Moravia, in the circle of Brunn, anciently the see of a bishop; 25 miles S. of Brunn. N. lat. 48° 50'. E. long. 16° 47'.

KOSTELOTZ, a town of Bohemia, in the circle of Koniggratz; 16 miles S.E. of Koniggratz.—Also, a town of Bohemia, in the circle of Kaurzim, on the Elbe; 12 miles N.N.E. of Prague. N. lat. 50° 12'. E. long. 14° 45'.—Also, a town of Moravia, in the circle of Olmutz; 7 miles S.W. of Olmutz.

KOSTENBLUT, a town of Silesia, in the principality of Breslau; 18 miles W.S.W. of Breslau. N. lat. 50° 59'. E. long. 16° 40'.

KOSTESH, a town of European Turkey, in Moldavia; 16 miles N. of Birlat.

KOSTIAN, or KOSTAN, a town of the duchy of Warfaw; 20 miles S.E. of Pofen.

KOSTOLETZ, a town of European Turkey, in Servia; 18 miles E. of Semendria.

KOSTOLNA, a town and castle of Hungary; 24 miles N.W. of Topolztan.

KOSTROMA, a government, town, and river of Russia; the government, formerly included in that of Moscow, is about 210 miles from E. to W., and 150 from N. to S. The capital, Kostroma, with its district, is situated near the Volga, and furrounded by a rampart. N. lat. 57° 30'. E. long. 41° 14'. The river runs into the Volga at the capital.

KOSUMA, a town of Japan, in the island of Nippon; 60 miles W.S.W. of Meaco.

KOSZARA, a town of Bosnia; 12 miles N. of Banjaluka.

KOSZO, a town of Lithuania, in the palatinate of Novogrodek; 60 miles S.S.W. of Novogrodek.

KOSZULA, a town of European Turkey, in Moldavia; 36 miles N.W. of Jaffy.

KOTAH. See KOTTA.

KOFAIGROD, a town of Poland, in Podolia; 12 miles S.E. of Kaminiac.

KOTAN. See HOTOH.

KOTANA, a town of Hindoostan, in the circar of Sirhind; 40 miles E.N.E. of Sirhind.

KOTANKODERIPO, a town on the E. coast of Ceylon; 10 miles S.E. of Batacala.

KOTAR, a province of Dalmatia, about 30 miles long, and 20 broad; called also the county of Zara, from its capital Zara.

KOTCHA, a town of Russia, in the government of Perm; 60 miles W. of Solihanfk.

KOTCHEEL, a town of Hindoostan; 10 miles S. of Agimere.

KOTCHELOVSKAIA, a town of Russia, in the country of the Cossacks, at the conflux of the Donetz and the Don; 52 miles E. of Azoph.

KOTCHENGSKA, a town of Russia, in the government of Irkutsk, on the Ilm; 60 miles W.S.W. of Orlena.

KOTCHUG, a town of Russia, in the government of Irkutsk, on the Lena; 16 miles E. of Vercholenk.

KOTELNA, a town of Poland, in the palatinate of Kiev; 60 miles W.S.W. of Kiev.

KOTELNITCH, a town of Russia, and district of the government of Viatka, on the Viatka; 36 miles S.W. of Viatka.

KOTIAKOF, a town of Russia, and district of the government of Simbirsk, on the right side of the river Sura.

KOTIGNOW, a town of Poland, in Podolia; 34 miles N. of Kaminiac.

KOTINGHY, a town of Hindoostan, in the circar of Ruttunpour; 36 miles N.E. of Raypour.

KOTLAN, a town and capital of a district of the same name, in Great Bucharia; 200 miles S.E. of Samarand. N. lat. 38° 10'. E. long. 68° 36'.

KOTMANA, a town of Valachia, near the source of a river of the same name, which runs into the Danube; 45 miles N.W. of Buchareit.

KOTNA, a town of Great Bucharia, on the Gihon; 40 miles S. of Bokhara.

KOTNAR, a town of Moldavia; 24 miles W.S.W. of Jaffy.

KOTO, or LAMPI, a small and barren district of Africa, on the Slave Coast, in the Whidah country, extending about 18 miles along the Atlantic; the land is flat and the soil sandy. Slaves have been the chief article of trade with the Europeans. The chief town is called Koto, or Verku.

KOTONA, a town of Hindoostan, in Mewat; 25 miles N.N.W. of Cotputly.

KOTOO, one of the small Friendly islands, furrounded by coral reefs, and scarcely accessible by boats; not more than 1½ mile, or two miles long, but not so broad. The N.W. end of it is low, like the islands of Hapae; but it rises suddenly in the middle, and terminates in reddish clayey cliffs at the S.E. end, about 30 feet high. In that quarter the soil is of the same sort as in the cliffs; but in the other parts, it is a loose black mould. It produces the same fruits and roots which are found in the other islands; it is tolerably cultivated, but thinly inhabited. The water is dirty and brackish. The burying places are neater than those of Hapae; 16 miles N. of Anamooka. S. lat. 19° 58'. E. long. 185° 11'.

KOTRA, a town of Lithuania, in the palatinate of Troki; 15 miles E.S.E. of Grodno.

KOTROU, a town of Africa, on the Ivory Coast.

KOTSKA, a town of Russia, in the government of Irkutsk, on the Tunguska; 140 miles N.N.W. of Ilimfk.

KOTLA, or KOTAH, a circar of Hindoostan, in Malwa; bounded on the N. by Rantampour, on the E. by Yohud and Chandaree, on the S. by Kitchwara, and on the W. by Meywas, or Oudipour. It is crossed in the centre by the river Jeshul.—Also, a town, which is the capital of the circar, seated on the Jeshul. This town is of considerable extent, of an irregular oblong form, inclosed with a stone wall and round bastions. It contains many good stone houses, and several handsome public edifices. The palace of the rajah is an elegant structure. The streets are paved with stone. It has, on the W., the river Chumbul, and on the N.E. a lake, smooth and clear as crystal, which, on two sides, is banked with stone, and has, in the middle, a building called "Jug-mundul," which is consecrated to religious purposes. Near the N.E. angle of the town, and

only separated from the lake by the road, is the "Chetrea," or manoleum of one of the knights. In front of this handsome building are placed several statues of horses and elephants, hewn out of stone. To the fourth of the city, about three furlongs beyond the wall, is a place consecrated to the celebration of Rum's victory at Lanka. Behind this, in a recumbent posture, is an enormous statue of earth, which represents the demon "Rawoon." On the day of celebration the principal people assemble; and the fire of the guns is directed against the earthen wall, which make a breach in it, and deface or demolish the image of Rawoon. The revenue of Kotah is 30 lacks of rupees; out of which is paid, though not regularly, a tribute of two lacks yearly to Sindiah, and as much to Holcar. N. lat. 25° 15'. E. long. 76° 20'. *Asiat. Ref.* vol. vi.

KOTTIMBEL, a small island in the Red sea. N. lat. 17° 57'. E. long. 41° 25'.

KOTFIS, a town of Austria; 10 miles S.E. of Zwettl.

KOTTCOMB, a town of Africa, in Bornou; 75 miles S. of Bornou.

KOTTOKOLEE, a town of Africa, and capital of a country of the same name, in Negroland. N. lat. 13°. E. long. 5° 40'.

KOPUL, a town of Hindoostan, in Bundelcund; 20 miles S. of Pannah.

KOTY, a town of Bundelcund; 18 miles S. of Callinger.

KOTZENAU, a town of Silesia, in the principality of Lignitz; 16 miles N.W. of Lignitz.

KOU, a town of Turkish Armenia; 30 miles S.E. of Akalkiké.

KOUAKAND, a town of Turkestan, on the Sirt; 60 miles S. of Tashkund.

KOUANG-SI, or QUANG-SI, a city of China, of the first class, in the province of Yun-nan. N. lat. 24° 40'. E. long. 103° 28'.

KOUANG SIN, or KOANG-SIN, a city of China, of the first class, in the province of Kiang-si. This city is surrounded by mountains, many of which are lofty, and about some of them with forests, and others with fine crystal; the country, however, is fertile and well inhabited; many of the mountains are cultivated, and are no less productive than the most fertile plains. They make a very good paper in this city, and the best candles in the empire. N. lat. 28° 27'. E. long. 117° 44'.

KOUANIN, in the *Chinese Language*, the name of a tutelary deity of women. The Chinese make great numbers of the figures of this deity in white porcelain, and send them to all parts of the world, as well as keep them in their own houses. The figure represents a woman with a child in her arms. The women, who have no children, pay a sort of adoration to these images, and suppose the deity they represent to be of power to make them fruitful. It has been supposed, by many Europeans, that these images were meant to represent the Virgin Mary, with our Saviour in her arms; but this is an idle opinion; the Chinese having been fond of this figure in all times that we have an account of. The statue always represents a handsome woman, very modestly attired.

KOVAR, in *Geography*, a town of Hungary; 16 miles N.W. of Bilritz.

KOVARABAD, a town of Great Bucharia, in the kingdom of Balk; 90 miles W. of Balk.

KOUCO, a town of Africa, in Upper Guinea, on the river Scherbro; 36 miles from the sea.

KOUDJEH, a town of Asiatic Turkey, in Natolia; 48 miles W. of Kiutaja.

KOUDRA, a town of Hindoostan, in Bahar; 27 miles S. of Burwah.

KOUDUR, a town of Hindoostan, in Dowlatabad; 7 miles N.N.W. of Beder.

KOUE-HOA, a city of China, of the first class, in the province of Yun-nan. N. lat. 23° 26'. E. long. 103° 56'.

KOUEIT, 柯雷, *Cathem*, or *Kadhma*, a sea-port town of Arabia, in the province of Lachia, situated in a bay of the Persian gulf, and governed by a feichei, who is vassal to the feichei of Lachia, but occasionally aspires to independence. Whenever the feichei of Lachia advances with his army, the citizens of Koueit retreat with their effects into the little island of Feludsje. The inhabitants are chiefly occupied in fishing, and particularly for pearls; in which business they are said to employ more than 800 boats. N. lat. 27° 40'. E. long. 48° 10'.

KOUEI-TE, a city of China, of the first class, in the province of Ho-nan, situated in an extensive and fertile plain, between two large rivers; but in order to render it opulent, it wants an increase of inhabitants and trade. The air is pure, and the fruits, especially oranges and pomegranates, are excellent. The inhabitants are distinguished by their mildness and hospitality. The jurisdiction of this city comprises seven towns. N. lat. 34° 30'. E. long. 115° 29'.

KOU-HISAR, a town of Asiatic Turkey, in Caramania; 12 miles N.W. of Akferai.

KOVINSKOL, *Nivnei*, *Sred*, and *Yerebnei*, towns of Russia; the first, on an island in the river Kolima, N. lat. 69° 40'. E. long. 156° 24'.—the second, in the government of Irkutsk, on the Kolima, N. lat. 65° 5'. E. long. 158° 14'.—the last, in the same government, on the same river, N. lat. 66° 15'. E. long. 149° 14'.

KOUKOU, or KOUGOU, a town of Asia, in the kingdom of Gaaga; the residence of a powerful king in the twelfth century.

KOULIK, in *Ornithology*. See *RAMPHASTOS Pipivivorus*.

KOULI-KHAN, THAMAS, or NADIR SHAH, in *Biography*, was born in the province of Khorasan; his father was chief of a branch of the Afghans, which rank descended to Nadir when he was a minor, but his uncle usurped the government. On this he entered into the service of the Beglerbeg, governor of Muscada, in Khorasan, who gave him the command of an army sent against the Tartars. Nadir, on this occasion, gave signal proofs of his prowess and military skill; he gained a complete victory with an inferior force, and took the Tartar general prisoner. For this able conduct, the Beglerbeg appeared extremely grateful, and, at first, treated Nadir with great distinction, but at length he became jealous of his aspiring spirit, and refused to promote him in the army as he had promised, and when Nadir complained of his breach of faith, he caused him to be banished. Driven to desperation, he joined a banditti of robbers, and committed great ravages. The Afghans having made themselves masters of Ipahan, and the Turks and Muscovites ravaging other parts of Persia, Schah Thamas applied to Nadir for assistance. He, without hesitation, entered into the service of the schah; but one of his first actions was to murder his uncle who had usurped his title. For his great services against the Turks, he was ennobled with the title of khan, and honoured with other distinctions; nevertheless, he deposed Thamas, and placed a son of that prince on the throne by the name of Abbas III. to whom he became regent. Under a prince, six months old only, Kouli-khan meditated to be the real sovereign of Persia. He disposed of every thing according to his own pleasure: he defeated the Turks, and obliged them to sue for peace. Within a few months the prince died,

died, and Kouli-khan was elected to the vacant throne, and on his accession assumed the name of Nadir Shah. His reign was marked with a high degree of glory, but his government was to the last degree despotic. In the year 1739, he conquered the Mogul empire, making himself master of Delhi, where he acquired immense riches. He there assumed the title of emperor of the Indies, but disgraced himself by ordering a massacre of the inhabitants of Delhi, in revenge for an insult offered to some of the troops. The project was discovered, and the profcribed party assembled with a view of taking revenge. They were surrounded by a powerful army, which was devoted to the schah. It was necessary to force a confidential guard, and they were neither acquainted with the situation of the emperor's tent, nor knew how to distinguish it from the rest. Despair, however, enabled them to surmount every obstacle. Five of them rushed into the pavilion, and the emperor was instantly known by the glitter of the ornaments with which he was covered. In defending himself he slew two of the conspirators, when a third gave him a mortal wound. He exclaimed "spare me, and I will pardon all." "No," replied the fourth, "thou hast never shewn mercy to any, and we will shew none to thee." They then dispatched him, and severed his head from his body. This event took place in 1747. Univer. Hist.

KOUM, in *Geography*, a town of Thibet; 15 miles N. of Darmadjira.

KOUNDGL-AGHIZ, a town of Asiatic Turkey, in the government of Sivas, on the coast of the Black sea; 15 miles N.W. of Samfoun.

KOUNMEON, a town of Birmah; 48 miles N. of Ava. N. lat. 22 35'. E. long. 97° 56'.

KOUPHOLITE, in *Mineralogy*. See PRENNITE.

KOURAH, in *Geography*, a town of Natolia; 44 miles W. of Kutaja.

KOURATTY, a town of Hindoostan, in Dowlatabad; 15 miles W. of Carmulla.

KOURESTAN, a town of Persia, in Laristan; 36 miles S. of Tarcam.

KOURMA, or KURMA, a small town of Dar-Für, W. by S. of Cobbé, at the distance of 12 or 13 miles.

KOVROF, a town of Russia, and district of the government of Volodimir, on the river Kliasma; 24 miles E. of Volodimir.

KOUROU, a river of Guiana, which runs into the Atlantic, N. lat. 5 5'. W. long. 53 36'.

KOUS. See COUS and APOLLINIS *Urbs*.

KOUSSIE, a river of Africa, which runs into the Atlantic, S. lat. 30° 12'. E. long. 17 50'. This river is the northern boundary of the colony of the Cape of Good Hope.

KOUSSIS. See KAFFERS.

KOUTA, a town of Hindoostan, in Vissipour; 10 miles N. of Merritch.

KOUXEURY, in *Ichthyology*, a fish found in the lakes of South America, whose palate is employed by the Indians for polishing their carvings in wood. It is unknown to which genus this fish belongs.

KOWAL, in *Geography*, a town of Asia, in the province of Adirbeitzan; 120 miles W. of Tauris.

KOWAL, or COWAL, a town of Poland, in the palatinate of Brzesc; 16 miles E. of Brzesc.

KOWAR, a town of Africa, in the kingdom of Burfalli, on the river Gambia, which formerly had a large traffic in slaves.

KOWARSKO, a town of Lithuania, in the palatinate of Wilna; 10 miles N. of Wilkomierz.

KOWEL, a town of Poland, in Volhynia; 28 miles N.W. of Lucko.

KOWERO, a town of Sweden, in the government of Kuopio; 80 miles E.S.E. of Kuopio.

KOWNO, or KOWIA, a town of Lithuania, in the palatinate of Troki, at the conflux of the rivers Wilna and Niemen, containing eleven churches, one of which is Lutheran; 40 miles N.W. of Troki. N. lat. 54° 54'. E. long. 23° 45'.

KOWRA, a town of Birmah; eight miles N. of Raynangong.

KOWRAH, a town of Hindoostan, in Guzerat; 10 miles S. of Gogo.

KOWROWA, a village in Karakakooa bay, rendered infamous by the murder of captain Cook. See COOK, and KARAKAKOOA.

KOYAHT, a small American isle, at the S. end of Washington's isle, at the entrance of a strait separating a small isle from the largest.

KOYDANOW, a town of Lithuania, in the palatinate of Minsk; 16 miles S.W. of Minsk.

KOZAK, JOHN SOPHONIOUS, in *Biography*, a physician of some celebrity, was a native of Bohemia, and practised his profession at Bremen during a series of forty-five years, and died there on the 30th of January 1685, at the age of 82. He was an admirer of Robert Fludd, the rosyercrucian, and adopted many of his fanciful notions in his writings. He left the following works: "Discurfus Physic quatuor, de rerum naturalium principijs, de generationum et transmutationum modis, morborum causis et speciebus, methodo curationum," Bremen, 1631.—"Anatomia vitalis Microcosmi," ibid. 1636.—"Tractatus spagyrici de Phlebotomis et de Fontanellis," ibid. 1655.—"Tractatus Medicus de Sale, ejusdemque in corpore humano resolutionibus salutaribus et noxis," Francfort, 1663.—"Tractatus de Hæmorrhagiâ," Ulm, 1666. Eloy, Dict. Hist.

KOZANGRODEK, in *Geography*, a town of Lithuania, in the palatinate of Brzesc; 42 miles E. of Pinski.

KOZAR, a town of Persia, in the province of Adirbeitzan; 75 miles W. of Tabris.

KOZDAR, a town of Asia, in the kingdom of Candahar, on the borders of Persia; 180 miles S.S.E. of Candahar. N. lat. 30° 30'. E. long. 67° 15'.

KOZELSK, a town of Russia, and district of the government of Kaluga, seated on the left side of the small river Shifra, which falls into the Oeca; 36 miles S.S.W. of Kaluga.

KOZELUCH, JOHN ANTHONY, in *Biography*, music director in the Metropolitan church at Prague, was born at Wellwar, in Bohemia, 1738. He studied and lived privately many years at Prague, long before he obtained any professional honours or preferment. His first advancement was to the place of chapel-master of Chril-church, and the next, in 1784, was that of organist of the dan kirk or cathedral. He afterwards distinguished himself as a composer both for the church and theatre. Among his productions for the latter are his Italian operas of Demofonte, and Alessandronell' Indie, by which he very much increased his reputation. It is a pity, says Gerber (*Musical Lexicon*) that more of his works have not been published!

KOZELUCH, LEOPOLD, a celebrated harpsichord-master and composer for that instrument at Vienna, was born at Wellwar in 1753. He had learned the principles of music regularly at 18 years old, and the art of singing. At 19, he was brought to Prague, where he studied at the same time composition and the harpsichord. But before he was 18, he produced specimens of his genius and talents. In

1771, he published his first essay at composition, in a ballet for the Prague playhouse. This was followed by 24 others and two pantomimes. After this he was invited to Vienna, where he established himself, and whence his fame and works were circulated all over Europe, with those of Vanhal, Hady, and Mozart. His style is more easy than that of Emanuel Bach, Haydn, or Mozart; it is natural, graceful, and flowing, without imitating any great model, as almost all his contemporaries have done. His modulation is natural and pleasing, and what critics of the old school would allow to be warrantable. His rhythm is well phrased, his accents well placed, and harmony pure. He published 20 or 30 different sets of harpichord and piano-forte sonatas, some with and some without accompaniments, which were not only in high favour with the ladies of Vienna, but with female dilettanti all over Europe. The adagios and violin accompaniments to all his pieces have been universally admired. If any one set of his sonatas was more in favour at Vienna than another, it was his 12th set. He was the first in Vienna who published duets for two performers on one-keyed instruments, and several of them are excellent. He published likewise a duet for two harpichords, or pianofortes, with many concertos for the harpichord à grand orchestre.

Nor has he confined himself to instrumental music; he has set a French comic opera, *Le Muret*; *Didone abbandonata*, a serious opera in Italian; *Moses in Egypt*, a grand oratorio, in Italian, 1787, the best for the widows and children of decayed musicians, that had been composed for that society. The same year he was engaged, by a society of 150 subscribers, to compose for the Italian opera: and for the national theatre, or German playhouse, he composed airs, cantatas, and ballets without end. In 1781, on the death of the empress queen, he composed the music to a very pathetic dirge. Joseph and his Brethren, a cantata, with a harpichord accompaniment only. Pfeifel's cantata for Mad. Paradis, his scholar in 1784, with innumerable lessons and concertos expressly for that blind but admirable performer; 15 songs to German words, and cantatas in Italian, with accompaniments for two French horns, two violins, hautbois, tenor, and base; three symphonies, various sets of trios, and quartets; two concertos for clarinets, and two for the violoncello.

**KOZIN**, in *Geography*, a town of Poland, in Volhynia; 24 miles S. of Lucko.

**KOZLAN**, a town of Bohemia, in the circle of Rakonitz; 12 miles S.W. of Rakonitz.

**KOZLOV**. See **KOSLOP**.

**KOZMODEMIANSK**, or **KUSMODEMIANSK**, a town of Russia, and district of the government of Kazan or Casan, on the Volga; 100 miles N.W. of Kazan.

**KOZU**, a town of Poland, in the palatinate of Volhynia; 56 miles E. of Lucko.

**KRABBen**, a small island in the Atlantic, near the coast of Guiana. N. lat. 0° 10'. W. long. 57° 50'.

**KRAFT**, **GEORGE WOLFGANG**, in *Biography*, a celebrated mathematician, was born at Durlingen, where his father was pastor. He received a good education, but applied himself chiefly to geometry and natural philosophy, in which he made great progress under the celebrated Bulingger, whose friendship and patronage he enjoyed. In 1728, he took his degree of master of arts, and almost immediately set out for Peterburgh, and was appointed teacher, in that city, of mathematics in the New college, founded by the Imperial Academy of Sciences. At the end of five years, he was appointed a professor of natural philosophy. He was, in consequence of his great reputation, recalled to his

native country, which obliged him to solicit permission to resign his professorship. This was accompanied with the most distinguished testimonies of high esteem; the academy elected him an honorary member, and settled upon him a handsome pension. He quitted Peterburgh in 1744, and arrived at Tubingen, where he entered on his office as professor of mathematics and natural philosophy, which he retained till his death in 1754. He was author of many very valuable works, among which are "Institutiones Geometriæ sublimioris;" "Prælectiones Academicæ publicæ in Physicam Theoreticam;" "De vera experimentorum Physicorum constitutione;" "De Hydrostaticis Principiis generalibus."

**KRAGG STONE**, a rock found near Belfast, belonging to the stetztrapp formation, but which, together with those rocks called wacke and mullen, is kept distinct from basalt by Mr. Kirwan, who gives the following description of the kragg stone. Colour greyish-red or reddish-grey, exceeding porous: the pores often filled with various crystallizations. Lustre and transparency none. Fracture uneven and earthy; fragments 2; hardness from 5 to 7. Spec. grav. 2.314. Feels rough and harsh; gives a yellowish-grey streak. At 138 it melted into a reddish-brown porcelain mass. It is often mixed with globules of magnetic iron-stone, which adds considerably to its specific weight.

Wacke, mullen, and kragg (Mr. Kirwan adds) have been by most writers confounded with what he considers as trap; but their colour, specific gravity, and fusibility, shew that they must be distinguished.

**KRAGLIKIU**, in *Geography*, a town of Moldavia; 95 miles N.N.W. of Jassy.

**KRAGOJEVA**, a town of Servia; 45 miles N.E. of Novibazar.

**KRAGOWATZ**, a town of Servia; 30 miles N.N.W. of Belgrade.

**KRAKA**, a town of Walachia, on a considerable lake, that communicates with the Danube; 30 miles S.S.E. of Bucharest. N. lat. 44° 5'. E. long. 26'.

**KRAKAN**, a small island on the W. side of the gulf of Bothnia. N. lat. 63° 30'. E. long. 19° 33'.

**KRAKATOA**, a small island in the straits of Sunda. S. lat. 6° 6'. E. long. 105° 21'.

**KRAKAW**, or **KRAKO**, a town of the duchy of Mecklenburg, on a lake; 10 miles N. of Guldrow.

**KRAKEN**, in *Zoology*, a marine animal of most stupendous magnitude, said to have been seen in the northern seas, and particularly near the coasts of Norway and Sweden. The existence of such an enormous creature is attested by bishop Pontoppidan, who, in his "Natural History of Norway," affords an entertaining, if not a very satisfactory and accurate, account of this surprising creature. From his details we learn the kraken lies in the deeper parts of the sea, in eighty or one hundred fathoms water, and at some leagues from land. This mighty, and as it seems unwieldy mass of animated substance, very rarely rises near the surface; when it does, the calmest sea becomes troubled to a vast distance around it, the heaving billows point out the more immediate space in which it will emerge, and when it has risen, those parts visible above the surface of the water assume the aspect of so many islands, variable in dimensions as well as shape, at every motion of the kraken. The form of this enormous being is compared to that of a crab; the back or upper part, (so far as can be probably estimated,) is said to be a mile and a half in circumference, (or, as some affirm, even more.) Its limbs, and of these it is furnished with several, are truly gigantic, appearing, when elevated above the water, as thick and long as the masts of vessels of a moderate size, and are besides endowed with so much strength, that

that with one of these it can seize on boats and the smaller kinds of vessels, and draw them under water. The descent of this monster from the surface of the sea to the bottom, is said also to be not less terrible than its rising, since it occasions a swell and whirlpool so violent and irresistible, that ships of the largest burthen, drawn within its vortex, inevitably sink into the abyss of the waters, and sink to rise no more.

These, and various other circumstances equally calculated to excite astonishment, are related of the kraken by the learned prelate before mentioned, the particulars of which have been differently received, many having placed an implicit confidence in his relations, and others as strenuously determining to reject them as tales unworthy of belief. In justice to Pontoppidan, we should observe, however, that though we are principally indebted for our knowledge of the kraken to this writer, it must be understood that the existence of such an animal as the kraken is not testified on his authority alone; nor is it in his volumes only that details so marvellous have appeared; his accounts in general are in a greater or less degree corroborated by several northern writers, and with such internal evidence of truth, that we cannot reject their reports as wholly fabulous, or conceive the kraken to be the mere creature of fiction. Still we must receive their observations deliberately; we may, and certainly do, on their veracity, admit the probable existence of a marine animal, such as the kraken is described, of a size very far surpassing that of the whale, and consequently, of any animal at present known, but here we pause; we have yet to be informed how far the truth has really been exaggerated as to the actual magnitude, and powers of this tremendous creature. As to the nature of this being, that particular appears to be pretty clearly defined; we have little doubt, if any confidence can be placed in the confessedly imperfect descriptions left us by different authors, that it is a creature by no means analogous either to the whale tribe, or any kinds of fishes; it is assuredly, on the contrary, one of the mollusca order or family of worms peculiar to the sea. Denys Montfort, a writer who seems to have considered its nature with attention, believes it to be a sort of sepia, an idea not improbable, or perhaps rather, should fortune ever favour the naturalist so far as to decide the point in question, it may prove to be one of the meduse tribe; this we suggest, though we should still rather be inclined to imagine it an animal of a distinct genus not at present ascertained, as being most likely partaking in some degree of the characters both of the genera *SEPIA*, and *MEDUSA*, and yet not strictly pertaining to either. See *SEPIA* and *MEDUSA*.

**KRAKO**, in *Geography*, a town of Sweden, in the province of Upland; 17 miles N. of Upfal.

**KRAKON**, a small island on the W. side of the gulf of Bothnia. N. lat. 61 33'. E. long. 17 9'.

**KRALAM**, a town of Bosnia, near the river Misaa; 34 miles S. of Serajo.

**KRALITZ**, a town of Moravia, in the circle of Olmutz; 8 miles S. of Olmutz.

**KRALOVAVELKA**, a town of Slavonia; 30 miles W. N. W. of Pofzega.

**KRALOWIDWUR**, or **KONIGINGHOF**, a town of Bohemia, in the circle of Koniggratz, on the Elbe; 13 miles N. of Koniggratz.

**KRALOWITZ**, a town of Bohemia, in the circle of Rakonitz; 13 miles S. W. of Rakonitz.—Also, a town of Bohemia, in the circle of Czassau; 16 miles S. W. of Czassau.

**KRAMER**, in *Biography*. See the next article.

**KRAMERIA**, in *Botany*, received its name from Lin-

næus, in commemoration of two German botanists, John George Henry Kramer, the father, and William Henry, the son, both of whom flourished towards the middle of the last century. The former, a physician to the army, published at Dresden, in 1728, an anomalous arrangement of plants, partly by the system of Rivinus, and partly by that of Tournefort, dividing them according to the months in which they flower. This same book, amended and enlarged, was reprinted at Vienna in 1744, interspersed with various remarks upon the technical terms of botany, anecdotes of what happened to the author in various journeys, and, according to Haller, many fabulous absurdities. He was also author of other botanical tracts.—The latter (William Henry) published at Vienna, in 1756, a catalogue of the animals and plants of Austria.—Linn. in *Loeffl. It.* 195. *Gen.* 63. *Schreb.* 86. *Willd. Sp. Pl.* v. 1. 693. *Mart. Mill. Dict.* v. 3. *Juss.* 425. (*Ixine*; *Loeffl. MSS.*)—Clas and former, *Tetrandria Monogynia*. *Nat. Ord.* uncertain, possibly *Lomentacea*, Linn. *Leguminosa*, *Inf.*

*Gen. Ch.* reformed. *Cal.* Perianth inferior, of four or five oblong, acute, unequal, spreading leaves, internally coloured, deciduous. *Cor.* Irregular, much shorter than the calyx, of five petals; the three uppermost with long claws, reflexed, and a small ovate limb, which is sometimes wanting in the middle one; two lowermost ovate, concave, sessile, at each side of the germen, scarcely spreading, much shorter than the others. *Stam.* Filaments four, at the upper side of the germen, awl-shaped, parallel, ascending, two of them rather shorter than the rest; anthers terminal, small, ovate, erect, opening by two terminal pores. *Pist.* Germen superior, sessile, ovate; style awl-shaped, ascending, nearly equal to the stamens; stigma simple, acute. *Peric.* Legume? globose, of one cell, not burbling, armed on all sides with barbed projecting bristles. *Seed* solitary, ovate, hard, smooth.

*Eff. Ch.* Calyx of four or five leaves. Petals five; the three uppermost with long claws; two lowermost sessile, ovate. Fruit globose, prickly, of one cell. Seed solitary.

*Obs.* It does not appear that Linnæus ever saw this genus; all that he says of it being taken, not very exactly, from Loefling; nor is there a specimen in his herbarium. Neither does Mutis seem to have known any thing of it, when he sent Linnæus a description of the *Acaena*, *Mant.* 2. 145, under the denomination of "*Krameria affinis*;" for these two genera have nothing in common, except a slight coincidence in their artificial characters, not founded in nature. This *Acaena* indeed was never seen by Linnæus, being adopted entirely from his friend's account. It is, with great judgment, referred by Jusseu to his own natural order of *Rosaceæ*, after *Ancistrum*, with which *Krameria* has no resemblance whatever.—The description and figure of a second species of *Krameria*, in Cavanilles, have enabled us to form some idea of its natural affinities, hitherto left in the dark, as well as to venture on a reformation of its generic characters; though all this is done from the above authorities alone, without inspection of any specimens. The genus in question will not conveniently go into any of Jusseu's present sections of the *Leguminosæ*, but a comparison of its anthers with those of *Callia*, its hard ovate seed, and its anomalous corolla, will, we presume, confirm those more obvious indications which have led us to the above conclusion, notwithstanding the strange and peculiar seed-vessel.

Only two species have hitherto been described by authors, both natives of South America.

1. *K. Ixina*. Linn. *Sp. Pl.* 177.—Leaves all simple. Calyx four-cleft.—Gathered by Loefling near the town of Comana, on the coast of the Caracacas, latitude about 10° S. The inhabitants

inhabitants call it *Cardillo Brevis*, or rather, as we presume, *Cardillo Brevis*, Teasel Fig, from the shape of the fruit and its barbed bristles. Whether there be any thing viscid in its habit, which might induce its discoverer to adopt the Greek name *Levis*, does not appear from his description here subjoined. "Roots fibrous. Stems shrubby, procumbent in their lower part, and spreading every way, but soon ascending and wand-like: their branches feathered and erect. Leaves alternate, lanceolate; the upper ones linear, acute, nearly sessile. Flowers alternate, in a terminal (leafy) cluster, their stalks axillary, furnished about the middle with two small acute linear bractæes. Calyx of a rosy purple. Upper petals pale at the tips, lower ones rugose, dark purple. The plant itself is of a brownish hoary hue."

2. *K. cythoides*. Cavan. Ic. v. 4. 61. t. 305.—Leaves ternate; the floral ones simple. Calyx five-cleft.—Found by Lewis Née, near the town of Cimapan in New Spain, especially on the hill commonly called *del carpintero*, bearing flowers and fruit in September.—The stem is shrubby, three feet high, with a grey bark; its branches numerous, alternate, downy when young. Leaves alternate, on longish, downy, compressed foot-blanks, ternate; leaflets elliptical, sessile, entire, downy. Flowers forming a simple cluster at the end of each branch, with a simple elliptic-lanceolate leaf at the base of each of their stalks, and a pair of smaller ones above the middle, the stalks all single-flowered, rather longer than the leaves, and downy. Calyx externally downy, internally of a violet red. Stamens equal, red, inserted into the receptacle, all at the upper side of the germen, and within the upper petals, which latter therefore cannot, as Cavanilles suggests, be abortive filaments. The lower petals are dark violet; the central one of the three upper is elongated, taper-pointed, and recurved, not dilated at the summit like the others. Germen hairy. Fruit globular, the size of a currant, downy, mucicated on all sides with longish projecting bristles, barbed at their points only with three or four sharp reflexed teeth. S.

KRAMERSKY, in *Geography*, a town of Prussia, in the province of Ermeland; 15 miles S. of Heilsberg.

KRANICHELD, a town of Saxony, in the principality of Altenburg; 12 miles S.E. of Erfurt. N. lat. 50° 43'. E. long. 11° 4'.

KRANOWITZ, a town of Silesia, in the principality of Troppau; 11 miles N.E. of Troppau. N. lat. 49° 55'. E. long. 18°.

KRANTZ, ALBERT, in *Biography*, a native of Hamburg, of whose early life we have no information, became professor of canon law and theology in the university of Rostock, and afterwards rector of it about the year 1482. He took his degree of doctor of divinity in 1490, and then removing to Hamburg was elected dean of the cathedral there. He obtained great reputation for his abilities and prudence, and was consulted on various occasions. Of such consequence was his opinion reckoned, that in the year 1500, the king of Denmark and the duke of Holstein made him their umpire in a dispute with the people of Dithmarsh. He died in 1517, leaving behind him a character for integrity and industry in his researches. His works are, "Chronica Regnorum Aquiloniorum Danicæ, Suevicæ, Norvegicæ;" "Vandalia, sive Historia de Vandalorum origine;" "Metropolis, sive Historia Ecclesiasticæ de Saxonia." Moreri.

KRAPERNA, in *Geography*, a town of Russia, and district of the government of Tula.

KRAPINA, a town of Croatia; 8 miles W. of Agram.

KRAPITZ, or KRZAPKOWITZ, a town of Silesia, in the principality of Oppeln, near the Ober; 12 miles S. of Oppeln. N. lat. 50° 25'. E. long. 17° 52'.

KRAS, a town of Poland, in the palatinate of Lublin; 26 miles S. of Lublin.

KRASILOW, a town of Poland, in Volhynia; 18 miles W. of Constantinow.

KRASCHENNIKOVIA, in *Botany*, a genus formed by Gleditsch, Nov. Comm. Petrop. v. 16. 551, of the *Azyris Cervatoides* of Linnæus, and which is retained in Schreber's Genera 633 under the name of *Distis*. Of the propriety of its establishment we have some doubts, having never examined the living plant, nor traced the progress from the flower to the fruit. It possibly, however, bears the same analogy to *Azyris* that *Atriplex* does to *Che-nopodium*.

KRASNE, in *Geography*, a town of Poland, in the palatinate of Braclaw; 24 miles N.W. of Braclaw.

KRASNEPOL, a town of Poland, in Podolia; 32 miles N.E. of Kamincez.

KRASNOBORSK, a town of Russia, and district of the government of Volgoda, in the province of Ve'iki-Uf-fing, on the left side of the Dwina; 60 miles N.N.W. of Uiling.

KRASNOBROD, a town of Poland, in the palatinate of Belcz; 28 miles W. of Belcz.

KRASNOI, a town of Russia, and district of the government of Smolensko, on a rivulet which falls into the Dnieper; 28 miles S.W. of Smolensko.

KRASNOIAR, a town of Russia, in the government of Upha; 16 miles N.N.W. of Upha.

KRASNOIARK, a town of Russia, and district of the government of Kolyvan, on the Yenisei, where it receives the Katcha: it was built in 1618, surrounded with palisades, small towers, and some batteries. The inhabitants, who occupy about 350 houses, principally trade in cattle, horses, and furs; 100 miles S. of Eniseisk. N. lat. 56°. E. long. 96 1/4°.

KRASNOIARSKAIA, a town of Russia, in the government of Irkutsk, near the conflux of the Oka and Angara; 64 miles W.S.W. of Ilimik.

KRASNOI-KHOLM, a town of Russia, and district of the government of Tver, on the river Schoea, which falls into the Mologa; 60 miles N. of Tver.

KRASNOKUTSK, a town of Russia, and district of the government of Kharkov, or Charcov, on the Merlo; 40 miles W.S.W. of Kharkov; which see.

KRASNOSLAW, a town of Poland, in the palatinate of Chem; 26 miles S.S.W. of Chem.

KRASNOSLOBODSK, a town of Russia, and district of the government of Penza, on the Mokvka, or Moskva; 84 miles N.W. of Penza.

KRASNOUFIMSK, a town of Russia, and district of the government of Perm, on the Upha; 96 miles S.E. of Perm.

KRASOIAR, a town of Russia, in the government of Caucasus, at the mouth of the Volga; 16 miles N. of Astrachan.

KRASUKKA, a small island on the E. side of the gulf of Bothnia. N. lat. 65° 22'. E. long. 24° 46'.

KRASUPOL, a town of Poland, in Braclaw; six mile E. of Braclaw.

KRASZNA, a town of Hungary, on a river of the same name, which runs into the Samos; 16 miles S. of Zatmar.

KRAUPEN, or KRUPKA, a town of Bohemia, in the circle of Leitmeritz; 14 miles W.N.W. of Leitmeritz. N. lat. 50° 41'. E. long. 13° 54'.

KRAUS, MARTIN, in *Biography*, an eminent scholar in polite literature, the son of a Lutheran clergyman, was born

in 1526, at Grebern, in the bishopric of Bamberg. He received his classical education at Ulm, where he acquitted himself with so much credit, that the magistratus of the city allowed him a pension to assist him in his future studies. He went to Strasburg, and added to his former acquisitions theology and the Hebrew language. He afterwards undertook the direction of the public school at Memmingen, which he rendered celebrated by adopting the methods pursued at Strasburg. In 1559, he was appointed professor of moral philosophy and the Greek language at the university of Tubingen, where he resided till the time of his death, which happened in 1607. He published a great number of works, grammatical and critical, with orations, Greek and Latin, but his most valuable publication is entitled "Turco-Greciae libri octo," containing an excellent collection of pieces relative to modern Greece, with the language and literature of which he was well acquainted. He was author likewise of *Annales Suevici, ab initio rerum ad annum, 1594.* A very short time before his decease, and foreseeing that the time of his departure was at hand, he gave an entertainment to the academical body, and presented to them, as a memorial of his esteem, a valuable gold goblet. Moreri.

**KRAUTHEIM**, in *Geography*, a town of Germany, on the Jaxt; 34 miles N. of Heilbronn.

**KRAW**, *Isthmus* of, the narrow part of Lower Siam, between the Indian sea and the gulf of Siam, about 70 miles wide. N. lat.  $9^{\circ}$  to  $12^{\circ}$ . E. long.  $98^{\circ} 20'$  to  $99^{\circ} 30'$ .

**KRAYSK**, a town of Lithuania, in the palatinate of Wilna; 84 miles E. of Wilna.

**KREESÉ**. See *CRISSE*.

**KREIDITSCH**, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 24 miles N.N.E. of Leitmeritz.

**KREMENTCHUK**, a town of Russia, and district of the government of Catharinenflaf or Ekaterinoflav, on the Dnieper; 38 miles W.N.W. of Ekaterinoflav. N. lat.  $49^{\circ}$ . E. long.  $33^{\circ} 10'$ .

**KREMINIEK**, a town of Poland, in Volhynia; 36 miles S. of Lucko.

**KREMPE**, a small town of Holstein, formerly situated on the banks of the Elbe and strongly fortified, but now only remarkable for the height of its steeples, which serves as a mark for seamen, situated between Itzehoe and Gluckstadt; 3 miles N. of the latter.

**KREMSIER** or **KROMERZZ**, a town of Moravia, in the circle of Prerau, on the Morawa, belonging to the bishop of Olmutz; 17 miles S. of Olmutz. N. lat.  $49^{\circ} 17'$ . E. long.  $17^{\circ} 20'$ .

**KREMSMINSTER**, a town of Austria; 12 miles W. of Steyr.

**KRENENSKAIA**, a town of Russia, in the country of the Cossacks, near the Don; 216 miles N.E. of Azoph.

**KRESABAD**, a town of Hindoostan, in Bundelcund; 28 miles S.S.W. of Pannah.

**KRESTA**, a small island near the S. coast of Nova Zembla, in the Straits of Waigats. N. lat.  $70^{\circ} 32'$ . E. long.  $59^{\circ} 20'$ .

**KRESTA, St.**, a gulf or bay of Russia, in the north part of the Anadirikaia gulf. N. lat.  $65^{\circ} 20'$  to  $65^{\circ} 40'$ . E. long.  $180^{\circ} 34'$  to  $181^{\circ} 24'$ .

**KRESTIAK**, an island in the Frozen sea, at the mouth of the Lena, of a triangular form, having its mean diameter about 12 miles. N. lat.  $77^{\circ} 42'$ . E. long.  $16^{\circ} 14'$ .

**KREUPEL**, a small island near the W. coast of Borneo. N. lat.  $3^{\circ} 47'$ . E. long.  $112^{\circ} 25'$ .

**KREUSBACH**, a town of Austria; 9 miles S.S.E. of St. Polten.

**KREUTZBURG**, a town of Russia, in the government of Polorsk, on the Dura; 60 miles E.S.E. of Riga.

**KREWITZ**, a town of the duchy of Mecklenburg; 10 miles E. of Schwerin. N. lat.  $53^{\circ} 40'$ . E. long.  $11^{\circ} 45'$ .

**KREWO**, a town of Lithuania, in the palatinate of Wilna; 42 miles S.E. of Wilna.

**KRICHEVSKAIA**, a town of Russia, in the government of Archangel, on the Dwina; 16 miles S. of Kolmogori.

**KRIEBEL KRANKHEIT**, the German appellation of the disease said to arise from eating the seeds of the *raphanus*, and thence called *Raphania* by Linnæus and others. See that article: also *ENGOR* and *IGNIS SACER*.

**KRIEGSTETTEN**, in *Geography*, a bailiwick of Switzerland, in the canton of Berne.

**KRIENS** and **HORB**, a bailiwick of Switzerland, in the canton of Lucerne.

**KRIGIA**, in *Botany*, named by Schreber, apparently in honour of Dr. David Krieg, a German physician, mentioned in the preface to the third volume of Ray's *Historia Plantarum*, who is there said to have accompanied Mr. William Vernon, fellow of St. Peter's college, Cambridge, in a botanical excursion through the province of Maryland. In this journey they discovered and collected some hundreds of new and rare plants, many of which are described in the work of Ray, above cited. Schreb. 532. Willd. Sp. Pl. v. 3. 1618 — Class and order, *Syngenesia Polygamia Æqualis*. Nat. Ord. *Compositæ Semisfoculosæ*, Linn. *Ciboraceæ*, Juss.

Gen. Ch. *Common calyx* simple, cylindrical, of about ten, lanceolate, erect, acute, equal leaves, shorter than the corolla. *Cor.* compound, somewhat imbricated, uniform, each flower hermaphrodite; proper, of one petal, tongue-shaped, linear, truncated, five-toothed. *Stam.* Filaments five, capillary, very short; anthers cylindrical, tubular. *Pistl.* Germen nearly ovate; style thread-shaped, the length of the filaments; stigmas two, reflexed. *Peric.* none; common permanent calyx ovate, at length reflexed. *Seeds* solitary, five-sided, striated, with a membranaceous crown of five, roundish, erect leaves; down capillary, consisting of five long rough bristles, alternating with the crown. *Recept.* naked.

Eff. Ch. *Receptacle* naked. *Calyx* simple, of many leaves. *Seed-down* of five membranaceous leaves, with five alternate bristles.

1. *K. virginica*. Willd. (*Hyoseris virginica*; Linn. Sp. pl. 1138. Michaux Boreal-Amer. v. 2. 88. Lamarck in Journ. d'Hist. Nat. v. 1. 222. t. 12.)—A native of Virginia and Pennsylvania, found even from Canada to Florida.—The habit of this plant is very similar to that of a starved Dandelion. *Radical leaves* at first ovate, then lanceolate, and at length lyrate, acute, smooth. *Stalks* naked, single-flowered, thrice as long as the leaves. *Calyx* perfectly simple, not imbricated, of ten lanceolate leaves. *Flowers* deep yellow. *Seeds* square, crowned with five long, rounded, membranaceous scales, and as many alternate, long, rough, straight bristles.

**KRIJNAGUR**, in *Geography*, a town of Hindoostan, in Mewat; 18 miles N.N.E. of Alwar.—Also, a town in Agimere; 15 miles E.N.E. of Roopnagar.

**KRIKA**, a district of Africa, in the kingdom of Calbari.

**KRIM**. See *CRIM*, *CRIMEA*, and *TAURIDA*.

**KRINK**, a town of Iltria; 12 miles S.S.E. of Capod'Istria.

**KRIS**,

KRIS, the denomination of Indians that inhabit the banks of lake Chirillineux, who can raise 1000 warriors.

KRISHNA, in *Hindoo Mythology*, one of the avatars, or incarnations of the god Vishnu, in which he is said by the sectaries, who exclusively worship him under this name, to have magnified himself in a degree of power and glory far exceeding any other of his forms. They maintain, indeed, that under the other avatars, he assumed only an *ansa*, or portion of his divinity, while Krishna was Vishnu himself in mortal mould. A numerous fable, called Gokalasta, from Gokala, one of Krishna's names, worship him exclusively, or conjointly with his consort Radha: this sect are immeasurably lavish in their praises, and vehement in their adoration of this deity, while other sects of Hindoos call Krishna an impious wretch, a merciless tyrant, an incarnate demon, now expiating his crimes in hell. As information is received from these different descriptions of zealots, so consequently will it differ in the account of the character and actions of this motley personage, of whom as much is recorded as of any of the Hindoo deities. His life and actions have occupied the attention of many voluminous writers; and if taken literally he led a life of excessive libertinism, but his followers maintain such appearances to have been the result of *maya*, or delusion, for that in reality his life was chaste and holy. The Gita Govinda, a beautiful poem by Jayadeva, is a series of mythical rhapsody in praise of Krishna, and a relation of his loves with his consort Radha, and although warm, and indeed loose, in a degree not admitting of literal translation into our language, is said to be purely mythical, and to mean the "reciprocal attraction between the divine goodness, and the human soul." This poem has been finely translated by Sir W. Jones, and appears in his works, and in the third volume of the Asiatic Researches. The same subject is mystically handled in the tenth book of the Sri Bhagavata, a life of Krishna, not hitherto translated, so much venerated among certain sects, as to be esteemed as the eighteenth Purana. (See JAYADEVA, MYSTICAL POETRY, SRI-BHAGAVATA, and PURANA.) Most of the extravagant tales related of Krishna, may be resolved into a continued solar allegory, for he is a personification of the sun, and corresponds with the Apollo of the Greeks. (See KALIYA.) His mortal parents were Vasu-deva and Devaki. He was fostered by an honest herdman named Ananda, or the happy, and his amiable wife Yasuda; and passed his youth in dancing, sporting, and piping among a multitude of young Gopas, or cow-herds, and Gopias, or milk-maids, from whom he selected nine as favourites. As a specimen of the tales of the Bhagavata, it may suffice to relate, that on one occasion the Gopias, his playfellows, (that is, the Muses) complained to Yasuda, that he had pilfered and ate their curds; and being reproved by his foster mother, he desired her to examine his mouth, in which, to her just amazement, she beheld the whole universe in all its plenitude of magnificence. Another of his miracles is given under *Kafsa*, which see.

Innumerable are the extravaganzas related of Krishna, whom some French writers have impiously compared with Jesus Christ. On this subject the following passage occurs, in Moor's Hindoo Pantheon, whence chiefly this article is taken. Describing a plate of Krishna destroying Kaliya, "It has," he says, "been surmised by respectable writers, that the subject here represented has reference to an awful event figuratively related in our scriptures, and Krishna is not only painted, as seen in the plates, bruising the head of the serpent, but the latter is made to retort by biting his heel. Among my images and pictures of this deity (and they are very numerous, for he is enthusiastically and

extensively adored, and his history affords great scope for the imagination) I have not one original, nor did I ever see one, in which the snake is biting Krishna's foot; and I have been hence led to suspect, that the plates engraved in Europe of that action are not solely of Hindoo invention or origin. I may easily err in this instance; but I am farther strengthened in the suspicion, from never having heard the fact alluded to, in the many conversations that I have held with Brahmans and others on the history of this avatara.

"Somner was, I believe, the first who exhibited Krishna crushing a snake: how, otherwise would he or any one kill it so easily and obviously, as by stamping on its head? Nor can the reptile in any mode retort but by biting the foot of its assailant. Zeal sometimes may have in its results the same effects as indelicacy; and one cannot help lamenting that a superstructure requiring so little support, should be encumbered by awkward buttresses, so ill applied, that they would, if it were possible, diminish the stability of the building that they were intended to uphold. Of this description were the zealous researches of some missionaries, who in Brahma and Saravati easily found Abraham and Sarah; and the Christian Trinity as readily discovered in the monstrous Trimurti of the Hindoos." (See SARASWATI and TRIMURTI.) Of this description also, I am disposed to think, are the attempts at bending to many of the events of Krishna's life to tally with those real or typical of Jesus Christ's. That Krishna, according to his historians, passed a life of a most extraordinary and incomprehensible nature, may be admitted; and that his name, and the general outline of his story, existed long anterior to the birth of our Saviour, is very certain, and probably to the time of Homer. His miracles are amazing, but ridiculous; a term that may, perhaps, be applied to a majority of the legends detailed with such prolixity in the modern poem, the Sri Bhagavata. He is represented as the meekest, tenderest, and most benevolent of beings; still, however, he fomented the terrible war described in the Mahabarat: he washed the feet of the Brahmans: he exhibited an appearance of excessive libertinism; but it was, they say, all *maya*, or *delusion*, for he was pure and chaste in reality; he uplifted mountains, raised the dead, (see KASYA,) descended into hell, and performed such motley exploits, as induced Sir William Jones (As. Res. i. 274.) to think that "the spurious gospels, which abounded in the first ages of Christianity, were carried to India, and the wildest parts of them repeated to the Hindoos, who engrained on them the old fable of Kefava, the Apollo of Greece."

Krishna has eight regular wives assigned him, whose names are 1. Rukmeni or Radha, an incarnation of Lakshmi; 2. Yamuminti; 3. Kalenderi, a water nymph, daughter of Surya, or the Sun; 4. Satyawama; 5. Lakhmeni; 6. Mitravinda; 7. Satya; 8. Vrundi. Of these something is said under their names respectively. He besides attached to him 16,000 women that he found virgins in the ample seraglio of a five-headed tyrant, who, for his manifold crimes, Krishna slew. The legendary tales descriptive of these events are of great length and variety. Each of these 16,000 women bore him ten sons, and each supposed herself the exclusive favourite of her lord. Kama, the god of love, is said to have been the offspring of his first wife Rukmeni; and in this birth he was named Pradyanna. (See KAMA.) On the death of Krishna, Rukmeni became a sati (see SATI), and, with several other of his wives, burned herself, with a view to an immediate reunion with her lord in Vaikontha. See VAIKONTHA.

Krishna's names, like other deified personages, are numerous. He being Vishnu, they enjoy several in com-

mon, Murari, Heri, Madhava, and Baghavan, among them; Govinda, Gopala, Gokala, are derived from his occupation of herdsman; Gopinatha, or the Gopai's god; Muridur, the tuncful; Keshu, Kefava, or Kefavi, are said to refer to the tuncfulness of his hair; Vaminali to his pendant garland; Yadava, Vaishtceya, and Vasudeva, to his tribe and family.

He is usually painted of a dark blue colour; his name Krishna denotes this; and with four arms; elegantly dressed with a profusion of jewels, and often playing on a pipe. Many plates of him are given in the Hindoo Pantheon, from original images and pictures, and many legends are there related, connected with their subjects. In the Gita Govinda he is thus described. "His azure breast glittered with pearls of unadmitted lustre, like the full bed of the cerulean Yamuna, interpersed with curls of white foam. From his graceful waist flowed a pale yellow robe, which resembled the golden dust of the water lily scattered over its blue petals. His passion was inflamed by the glances of Radha's eyes, which played like a pair of water birds with azure plumage, that sport near a full blown lotus, on a pool in the season of dew. Bright ear-rings, like two suns, displayed, in full expansion, the flowers of his cheeks and lips, which glistened with the liquid radiance of smiles. His locks, interwoven with blossoms, were like a cloud variegated with moon-beams; and on his forehead shone a circle of odorous oils, extracted from the sandal of Malaya, like the moon just appearing on the dusky horizon; while his whole body seemed in a flame, from the blaze of unnumbered gems."

In that very curious work translated by Mr. Wilkins, entitled Bhagavat-Gita, Arjun, the son of Pandu, addresses Krishna as "the supreme Brahm; the most holy; the most high god; the divine being before all other gods; without birth; the mighty lord; god of gods; the universal lord." In different parts of the Gita he says of himself, "I am, of things transient, the beginning, the middle, and the end: the whole world was spread abroad by me in my invisible form. At the end of the period kalpa (see KALPA) all things return into my primordial source; and, at the beginning of another kalpa, I create them all again. I am the creator of all mankind, uncreated, and without decay. There is not any thing greater than I, and all things hang on me, as precious gems on a string. I am the understanding of the wise, the glory of the proud, the strength of the strong. I am the eternal seed of all nature; I am the father and mother of this world, the grandfere and the preserver; I am death and immortality; I am entity and nonentity; I am never failing time; I am all-grasping death, and I am the resurrection."—"I am the emblem of the immortal, and of the incorruptible; of the eternal, of justice, and of endless bliss."—"Neither the sun nor the moon, nor the fire, enlighteneth that place, whence there is no return, and which is the supreme mansion of my abode."

Sanjay, one of the interlocutors of the Gita, describes Krishna, as he revealed his "million forms divine," to Arjun, "covered with every marvellous thing—the eternal god, whose countenance is turned on every side. The glory and amazing splendour of this mighty being may be likened to the sun, rising at once into the heavens with a thousand times more than usual brightness. The son of Pandu then beheld within the body of the god of gods, standing together, the whole universe divided forth into its vast variety." Arjun, terrified at this wondrous exhibition, exclaims—"Thou art the supreme being! I see thee without beginning, without middle, and without end; of valour infinite, of arms innumerable; the sun and moon thy eyes; thy mouth a flaming fire; and the whole world shining with thy reflected glory.

Having beheld thy dreadful teeth, and gazed on thy countenance, emblem of time's last fire, I know not which way to turn; I find no peace. Have mercy then, O god of gods! thou mansion of the universe! and show me thy celestial form, with the diadem on thy head, and thy hands armed with the club and *chakra*. Assume then, O god of a thousand arms! image of the universe! thy four-armed form."—Krishna is here, as usual by his sectaries, identified with Vishnu, and as "an emblem of time's last fire," and other passages of the above extracts, is apparently alluded to in the character noticed under KALPA, as the ruling Kalfva-rupi, or Chronus.

It is believed by some of the most respectable researchers into Hindoo theology, that the worship of Krishna, Rama, and other deified personages, is modern compared with the institutions of the vedas (see VEDA), in which no mention is made of such deities. As noticed under the article JAGANNATHA, one of the names of Krishna, he is principally worshipped at that extensively revered temple. Under JAMBAVANTI is related a legend of this frolicsome deity, who espoused a bear of that name. (See also KANSA.) Many plates, and legendary particulars and speculations, are given of Krishna and his extravagant history, in the work whence this article is taken, to which we refer the reader desirous of farther information thereon.

The name of Krishna is variously written in European languages: Crishta, Crishta, Kruitna, Kishna, Kishna, Quixena, Kishen, &c. and is differently pronounced in different provinces of India.

KRISS. See CREESE.

KRITANTA, a name of Yama, the Hindoo Pluto. KRITAMA is the name of a river connected with the history of this personage under some of his forms, and may have a common origin. See YAMA.

KRITIKA, in *Astronomy*, the Hindoo name of the Pleiades, respecting which their poetical mythologists have related many pleasing tales, every thing connected with Hindoo science being veiled in allegories. This constellation personified is, as one of the mansions of the moon, or Soma (see SOMA), fabled to be a beautiful nymph receiving the incessant deity in his nocturnal wanderings. (See NAKSHATRA.) The six Kritikas are feigned also to have been the wet-nurses of *Kurukya*, as mentioned under that article. Other legends make them the wives of the Rishis, who, among other characters, are made to shine the seven bright stars in Ursa major; but being unequal in number, further fables became necessary to reconcile the difference, and an astronomical legend is related in the Hindoo Pantheon, affording a specimen of the manner in which the Brahmans have buried, in mythological fictions, historical or scientific facts, and of the coincidence of these fictions with the tales of western fabulists. "It is related that Agni, or Pavaka, the ardent deity of fire (see PAVAKA), was charitably and gallantly disposed to communicate a portion of his warmth to these ladies, wives of the frozen Rishis; and situated as they were in the arctic circle, their complacency to such a comfortable suitor is not surprising. But it is said that he had not, in fact, complete success, for that his wife (see SWATA), dreading the resentment of the holy Rishis, assumed successively the shape and countenance of each of their desirable wives, and thus personifying them, satisfied her husband's ardour. Arundhati, however, the wife of Vashista (see VASISTHA) having always been exemplary, as to holiness and sanctity, was not suspected on this unlucky occasion; but the other six Rishis, in consequence of scandalous reports, not only dismissed their sparkling spouses, but, like great bears, drove them out of the arctic circle, and they now shine the Pleiades.

It would appear that they had qualified themselves for wet-nurses, and accordingly nursed young *Kartikya*, as noticed under that article, or were entrusted with his education, and were placed by him in the zodiac." In this wild tale we see an allusion to the disappearance of the seventh star of the Pleiades. Arundhati, the wife of Vasistha, is retained by him. The star called by his name is in lat. 61° N. and she is the smaller star near him. They are proverbial for constancy; and astrologers carefully watch their motion, as their influences are variously modified: whatever newly married couple see them in an auspicious conjunction or position, are surely to live happily together for a hundred years. Peurile as these stories appear, they are matched by others that we have been taught to listen to with more attention perhaps than they deserve. "The Pleiades, according to mythology, in the west, were entrusted likewise with the education of Bacchus (who, according to Macrobius, was the same with Mars, or Kartikya), and on that account he translated them into heaven. According to those writers they suffered a real bodily pollution; and the seventh, says Hyginus (Poet. Astro. p. 471.) left her sisters and fled to the regions of the heavens: and this is the Arundhati of the Hindoos. Hin. Pan. p. 88.

KRIVENA, in *Geography*, a town of European Turkey, in Bulgaria, on the Danube; 33 miles E. of Nicopolis.

KROBE, or SULCAVA, a town of the duchy of Warsaw; 32 miles S. of Posen.

KROEPELEIN, a town of the duchy of Mecklenburg; 12 miles W. of Roltok.

KROKEK, a town of Sweden, in East Gothland; 11 miles N.E. of Nordkiöping.

KROKINOW, a town of Samogitia; 22 miles E. of Rofienne.

KROKY, a town of Samogitia; 18 miles S.E. of Rofienne.

KROLENDORF, a town of Austria; 16 miles E. of Steyr.

KROMAYER, JOHN, in *Biography*, a learned German divine, who acquired a very high reputation as a preacher, and was appointed chaplain to the court of the duchess dowager of Saxony. The duke Weimar afterwards nominated him superintendent-general of the churches in that district, and the senate of that city chose him as pastor of their church. He died at the age of sixty-seven. He was author of "Harmonia Evangelitarum;" "Historiæ Ecclesiasticæ Compendium;" "Specimen Fontium, Scripturæ sacræ apertorium;" "A Paraphrase on the Prophecy and Lamentations of Jeremiah," &c. &c.

KROMAYER, JEROME, nephew of the preceding, was brought up chiefly at Leipzig, where he took his degree of M.A. in 1632. From that time he became lecturer on logic, rhetoric, natural philosophy, and astronomy. In 1643, he was appointed professor of history and oratory in the lesser college of princes, at Misnia. Four times he was called to the office of dean of the university; twice he presided as pro-chancellor, at the creation of masters, once he was chosen rector; and in the lesser college he was honoured three times with the post of provost. He filled several other high posts in the university with great advantage to the place, and died at the age of fifty, in the year 1670. He was author of "Commentaries on divers Parts of the Holy Scriptures;" of an "Ecclesiastical History," and other works.

KROMI, in *Geography*, a town of Russia, in the government of Orel; 16 miles S. of Orel.

KROMME, a river of Africa, forming a bay at its mouth in the Indian sea, S. lat. 34° 6'.

KRONENBURG. See CROKENBURG.

KRONHAMN, a small island on the W. side of the gulf of Bothnia. N. lat. 62° 25'. E. long. 17° 26'.

KRONOBY, a town of Sweden, in the government of Ulea; seven miles S. of Gamla Karleby.

KRONORN, a small island on the W. side of the gulf of Bothnia. N. lat. 63° 27'. E. long. 19° 8'.

KRONOTSKOI NOSS, a cape in the northern part of Kamtschatka, about which the land is very high. N. lat. 54° 42'. E. long. 162° 17'.

KROPPA, a town of Sweden, in the province of Warmeland; 30 miles N.E. of Carlstadt.

KROPPENSTADT, a town of Westphalia, in the principality of Halberstadt; nine miles E.N.E. of Halberstadt.

KROPSUNKARI, a small island on the E. side of the gulf of Bothnia. N. lat. 65° 10'. E. long. 25° 6'.

KROREN, a lake of Norway; 33 miles N.W. of Christiania.

KROSKA, a town of Servia, on the right bank of the Danube; 10 miles S.S.E. of Belgrade.

KROSNO, a town of Austrian Poland, in Galicia; 25 miles N.W. of Sanock.

KROTtau, a town of Bohemia, in the circle of Bolef-lau; 46 miles E. of Dresden.

KROUNA, a town of Bohemia, in the circle of Chrudim; 12 miles S.S.E. of Chrudim.

KROUSTA, in the *Ancient Music*, is a term purely Greek, implying the third species of musical instruments, which the Latins term *pulsatilia*, and the English, *instruments of percussion*; their tones being produced by beating with the hand, as drums, tabours, timbrels, &c. or with small sticks or iron rods, as the psaltry, cymbal, and dulcimer, or by being struck with hammers, as bells, gongs, pianofortes, &c.

Representations and descriptions of all these instruments may be seen in Lucicinus, Merfennus, Kircher, Bonanni, Laborde, and in almost all histories of music.

KROZE, in *Geography*, a town of Samogitia; 20 miles N.W. of Rofienne.

KRUCKEN, a town of Prussia, in Natangen; 15 miles S.E. of Brandenburg.

KRUDOSEL, a town of Persia, in the province of Ghilan; 12 miles S.E. of Reshd.

KRUDZEWO, a town of Lithuania, in the palatinate of Wilna; 16 miles S.E. of Wilna.

KRUG, LOUIS, in *Biography*. See GERMAN *School of Engraving*.

KRUGLIKIN, in *Geography*, a town of European Turkey, in Moldavia; 12 miles S. of Choczim.

KRUMPACH, a town of Austria; 20 miles S. of Ebenfurth.

KRUPA, a town of Poland, in Volhynia; 60 miles E. of Lucko.

KRUPKA, a town of Lithuania, in the palatinate of Minsk; 60 miles N.E. of Minsk.

KRUPULIK, a town of European Turkey, in Macedonia; 84 miles N.N.W. of Saloniki.

KRUSCHIN, a town of Prussia, in the palatinate of Culm; 24 miles E. of Culm.

KRUSZWICA, or KRUTSWICZA, a town of Poland, in the palatinate of Brzesc; 28 miles W. of Brzesc. This place deserves to be recorded, as it was the birth-place of Piast,

Piast, who, occupying the flation of a private citizen, was elected king of Poland in 842.

KRUTALA, a town of Russia, in the government of Tobolsk, on the Irtysh; 36 miles N. of Omsk.

KRUTEN, a town of Courland; 32 miles S.S.W. of Goldingen.

KRÜTOGORSKOI, an ostrog of Russia, in Kamtschatka. N. lat. 54° 50'. E. long. 155° 54'.

KRUWOTOW, a town of Austrian Poland, in Galicia; 22 miles S.E. of Halicz.

KRYLOW, a town of Galicia; 10 miles N. of Belz.

KRYOLITE, or CRYOLITE; *Alumine fluatée alcaline*, Haiiy. The colour of this mineral is snow-white, sometimes brownish-yellow, by the admixture of a small portion of iron ochre.

It occurs massive, generally in angular fragments with faint striæ, indicating a rhomboidal nearly cubical nucleus; secondary forms have not yet been observed.

Its luitre is vitreous, often inclining to pearly.

Fracture imperfectly foliated, smooth in one direction, and uneven in another.

It is translucent even in fragments of considerable size; small pieces approach to transparent, and when immersed in water for some time become completely fro.

It is soft, fo as to be scratched by fluor, particularly in the principal direction of the laminae.

It is easily frangible.

The specific gravity of kryolite is 2.928; that of a small fragment immersed in water for twelve hours was 2.941, Schumach. Haiiy flates it to be 2.949; Karlen 2.957; and Andrada 2.969.

Before the blow-pipe it soon melts, (though certainly not with sufficient ease or rapidly to warrant the incorrect appellation of kryolite, supposed to be derived from that circumstance;) and is afterwards converted into a white opaque pearly slag, of a slightly alkaline taste. With borax an opaque pearl is formed, which, some time after cooling, shews a degree of deliquescence. It is not operated on by the muriatic and nitric acids, but is dissolved by concentrated sulphuric acid under development of greyish-white vapours that corrode glass.

Professor Abildgaard, who was the first who analyzed this mineral, which had before been mistaken for a substance related to barytes, found it to be composed of alumine and fluoric acid. Vauquelin, who examined it after him, obtained the same results, and both chemists accounted for the small proportion of alumine which they found, by the possibility that part of the earth might have been carried off by the sulphuric acid. Klaproth was enabled to assign the true cause of the apparent disproportion by the discovery of a considerable proportion of soda, till then but little known as an ingredient of stony substances. His analysis, and the subsequent one by Vauquelin, have given the following results.

	Klapr. Beitr.	Vauquelin A. de Ch.
Alumine	24	21
Soda	36	32
Fluoric acid and water	40	47
	100	100

The only place where kryolite has been hitherto found is Greenland; but nothing is known respecting its geognostic situation. Werner, we are told, has adopted this mineral as a species of a genus of his, called the *Halite* genus, which is

to comprehend such substances as bear great resemblance to fossil salts, without possessing all the requisite characters to entitle them to be enumerated as such.

KRZEMIEN, in *Geography*, a town of the duchy of Warsaw; 34 miles S.W. of Bielsk.

KRZEMINIEC, a town of Poland, in Volhynia; 40 miles S.S.E. of Lucko.

KRZEPIEC, a town of Poland, in the palatinate of Cracow; 52 miles N.W. of Cracow.

KTEIPHE, a town of Syria, anciently called *Adariff*; the last town in the pachalic of Damafcus, encompassed with walls, as a defence against the Arabs; 22 miles N.E. of Damafcus.

KUAN, a town of Persia, in Farfistan; 16 miles S.S.W. of Schiras.

KUAR. See KAWAN.

KUASHKIR, a town of Imiretta; 21 miles S.S.W. of Cotatis.

KUAVAR, a town of Persia, in Ghilan; 90 miles N.W. of Reshd.

KUBA, a town of Persia, in Schirvan; 30 miles S. of Derbend.

KUBAN. See CUBAN.

KUBBET-CHIAR, a town of Arabia, in Yemen; 44 miles N. of Chamir.

KUBBOOLEAH, a town of Hindooistan, in the subah of Moultan; 45 miles E. of Moultan.

KUBENSKOI, a town of Russia, in the government of Vologda, on a lake of the same name, about 40 miles long and eight broad; 16 miles N.W. of Vologda.

KUBLICZ, a town of Lithuania; 15 miles S.E. of Braclaw.

KUBUCHANSKOI, a town of Russia, in the government of Irkutsk, on the Amul; 86 miles S.E. of Doroninsk.

KUCHAVIE, a town of Poland, in the palatinate of Kiev; 60 miles N.N.W. of Kiev.

KUCHTA, a town of Prussia, in the province of Olonetz; 52 miles N. of Pownetz.

KUCKENDORF, a town of Prussia, in Ermeland; 24 miles S.W. of Heilsberg.

KUDA, a town of Mingrelia, on the coast of the Black sea; 10 miles S.S.E. of Ilori.

KUDACOIL, a town of Bengal; 26 miles S.E. of Doefa.

KUDAMIA, a town of Egypt, on the E. branch of the Nile; 20 miles N. of Cairo.

KUDASELSKO, a town of Russia, in the government of Tobolsk. N. lat. 65° 15'. E. long. 81° 14'.

KUDDA, a town of Hindooistan, in Visiapour; 20 miles N. of Poonah.

KUDDANO, a town of Africa, in Bergoo; 65 miles N.W. of Wara.

KUDEEL, a town of Hindooistan, in Bahar; 20 miles W. of Ramgur.

KUDEZEVA, a town of Russia, in the government of Kolyvan; 28 miles S.E. of Kuznetk.

KUDINSKA, a town of Russia, in the government of Irkutsk; 32 miles N. of Irkutsk.

KVETLI, a town of Turkish Armenia; 27 miles W.S.W. of Akalziziké.

KUFFSTEIN, or KOPSTEIN, a town of the county of Tyrol, near the borders of Bavaria, on the Inn; built at the foot of a stupendous rock, on which is a castle, that serves for a fortress; 32 miles E.N.E. of Inspruck. N. lat. 47° 32'. E. long. 12° 14'.

KUGNA,

**KUGNA**, a river of Bessarabia, the waters of which begin to expand into a lake at Tobak, 30 miles from its union with the Danube.

**KUHDEAL**, a town of Bengal; 34 miles W. of Ramgur.

**KUHESTEK**, a sea-port of Persia, at the entrance of the Persian gulf; 36 miles W. of Ormus.

**KUHISAR**, a town of Caramania; 15 miles N.W. of Akferai.

**KUHMOIS**, a town of Sweden, in the province of Tavastland; 39 miles N.N.E. of Tavasthus.

**KUHMONIEMI**, a town of Sweden, in the government of Ulea; 50 miles E.S.E. of Cajana.

**KUHN**, JOACHIM, in *Biography*, a learned critic, son of a rich merchant at Gripfwalde, in Pomerania, was born in 1647. He studied at the university of Jena, and after visiting several parts of Germany, was appointed, in 1669, principal of the college at Oetingen in Suabia. In 1676, he was chosen professor of Greek and Hebrew at Strasburg. He died in 1697, and after his death appeared his "Quæstiones Philosophicæ ex facris Veteris et Nov. Test. aliisque scriptoribus." He is well known in the learned world by his editions of Ælian, Pausanias, and Diogenes Laertius.

**KUHNAU**, JOHANN, the son of a fisherman of Gryngingen, a town near Altenberg, on the borders of Bohemia, four miles distant from Dresden, was a learned and skilful musician of the higher class, among those who have formed and established the German school of music, particularly in the ecclesiastical style, and in organ playing.

In the year 1684, he was organist of the church of St. Thomas at Leipzig; and while in that station, he wrote a dissertation "De juribus circa musicos ecclesiasticos," and afterwards defended it against the censures of his adversaries.

In 1689, he published lessons for the harpsichord in two volumes, and in 1696 seven sonatas, entitled Clavier frucht, fruits of the keys or of keyed instruments; and in 1700, six sonatas, entitled Wiltliche Wiltosi, a bible narrative. Here Lustig of Groningen, in a Dutch treatise entitled "Inleiding tot de Musikkunde," takes notice of this work, and says that it is a lively representation, in musical notes, of David manfully combating Goliath. In the same year (1700) Kuhnau, to silence the clamours of some ignorant men of his profession, who, envying his merit and reputation, had libelled him, he wrote a small tract, which he entitled "The Musical Quack, or Mountebank." In the same year (1700) Kuhnau was appointed *director musicæ* of the university of Leipzig, in which station he died in 1722, in the 63d year of his age; and was succeeded in that honourable post by John Sebastian Bach. Kuhnau was celebrated immediately after his death in a Latin discourse by a count palatine and magistrate of Merseberg for his skill, not only in music, but theology, law, eloquence, poetry, foreign languages, algebra, and mathematics.

Mattheson, in his life of Handel, as the highest praise he could bestow on his performance, says, that he was even more powerful on the organ than the famous Kuhnau of Leipzig, who was then (in Handel's younger days) regarded as a prodigy.

**KUHNEELD**, in *Geography*, a town of Bavaria; 17 miles S.S.W. of Bamberg.

**KUHNTIA**, in *Botany*, so named by Linnæus, after his pupil Adam Kühn, a native of Pennsylvania, who travelled to Upsal for the sole purpose of improving himself in natural history, and brought this plant with him for the examination of Linnæus; in whom it excited considerable attention, as having distinct anthers, though in every other respect ap-

pearing to belong to the class *Syngenesia*. Arduino, who had obtained the same from Siberia, had referred it to *Eupatorium*, noting the peculiar structure of its anthers, which he describes as "divided into two or three bodies," or fets. He further adverts to the feathery feed-down, as differing from *Eupatorium*; and Linnæus remarks that the leaves, being alternate, afford another distinction, as to habit. On these grounds *Kubnia* was established as a genus in *Pentandria Monogynia*. So it remained till Gærtner, in his 2d vol. p. 411, having acquired another species, which he mistook for the original, and finding its anthers firmly united into a tube, took upon him to say that the Linnæan character of *Kubnia* was "altogether fictitious," and that the genus, differing from *Eupatorium* in having an evidently feathery feed-down, should be referred to the *Critonia* of Browne; see Browne's Jamaica, 490 and 314. Now this *Critonia* is *Eupatorium Dalea* of Linnæus, a true *Eupatorium*, with opposite leaves and a bristly feed-down, rough indeed, but by no means feathery, as is abundantly evident in Browne's own specimen now before our eyes. But the author last mentioned describes it "*pappo ramofo*," which it seems Gærtner adopted upon trust. We are well aware that the distinction between feathery and rough feed-down, is only a difference in degree; but by this many good genera are discriminated, and upon it, as a technical character, *Kubnia* must chiefly depend; for more recent examinations have found other examples of distinct anthers in compound flowers, witness several species of *Tussilago*, and one of *Siegesbeckia*; and as the genus in question has, according to the above authors, one species with united, and another with more or less distinct anthers, it is best placed with its natural allies in the *Syngenesia*, to which class we shall follow Willdenow in removing it.—Linn. Gen. 95. Schreb. 129. Willd. Sp. Pl. v. 3. 1772. Mart. Mill. Dict. v. 3. Juss. 177. Lamarck. Dict. v. 3. 370. Illust. t. 126. (Critonia; Gærtner. t. 174; and not Browne Jam. 490.)—Class and order, *Syngenesia Polygamia æqualis*. Nat. Ord. *Compositæ discoides*, Linn. *Corymbifera*, Juss.

Gen. Ch. *Common Calyx* oblong, imbricated; scales linear-oblong, erect, unarmed, unequal; the outermost sharpest and somewhat ovate; innermost bluntish, slightly membranous at the end. *Cor.* compound, uniform, discoid; florets from 10 to 15, all equal, perfect, fertile, of one petal, funnel-shaped, with a regular, five-cleft, erect border. *Stam.* Filaments five, capillary, very short; anthers oblong, either all united into one tube, or into two or three fets, or entirely distinct, each opening at the top, with a projecting lip. *Pist.* Germen oblong, furrowed; style thread-shaped, longer than the corolla, cloven down to the top of the anthers; stigmas two, slightly club-shaped, bluntish, spreading. *Peric.* none, except the permanent calyx. *Seeds* solitary, oblong, angular, rough; down sessile, long, feathery. *Recept.* naked.

Eff. Ch. *Receptacle* naked. Down feathery, sessile. Calyx imbricated, oblong. Style prominent, cloven half down, divaricated.

Obs. If the above characters be finally judged sufficient to establish *Kubnia*, the word *feathery* must be struck out of the character of the feed-down in *Eupatorium*; see that article.

1. *K. eupatorioides*. Linn. Sp. Pl. 1662. Linn. fil. Dec. 21. t. 11. (*Eupatorium alternifolium*; Ard. Spec. Alt. 40. t. 20.)—Leaves lanceolate, toothed, stalked. Anthers separate.—Native of Pennsylvania, from whence seeds were brought to the Upsal garden in 1762, and the plants they produced, kept in the green-houses, flowered the same year in November. *Root* fibrous, perennial. *Stems* several, herbaceous, a foot and half high, erect, round, leafy, mi-

ately downy, bearing a few short axillary branches. *Leaves* alternate, on short channelled bordered footstalks, lanceolate inclining to ovate, near two inches long, pointed, strongly and variously toothed, decurrent at the base, somewhat triply nerved, green, roughish, or minutely downy, on both sides, with pale ribs and veins. *Flowers* corymbose, terminating the stem and branches, white, with a striated roughish calyx.—We find no reason to doubt Ardeino's Siberian plant, in the Linnean herbarium, being the same species with that from the Ural garden.

2. *K. Critonia*. Willd. n. 2. (*Critonia* Kuhnia; Gært. v. 2. 411. t. 174; the synonyms wrong).—*Leaves* linear, nearly entire, sessile. *Anthers* united.—Native of Pennsylvania and Virginia, according to Willdenow, who had it alive. *Root* perennial. *Stem* round, smooth. *Leaves* an inch and half long, attenuated at each end, sessile, alternate, almost perfectly entire, smooth. *Corymbs* of few flowers, divaricated, at the top of the stem and branches. *Willd.*

Neither of these plants is known in the gardens of England. S.

KUHU, in *Mythology*, is the Indian goddess of the day. It is most likely one of the many names of Parvati; but respecting her very little has yet been made known.

KUIA, in *Geography*, a town of Russia, on the coast of the White sea, in the government of Archangel; 20 miles N. of Archangel.

KUIATZKAIA, a town of Russia, in the government of Irkutsk, on the Dzoornure, built in 1728 for carrying on commerce between the Russians and Chinese; it consists of two parts, one inhabited by the people of each country; 44 miles N. of Irkutsk. N. lat. 52° 50'. E. long. 105° 14'.

KUINUC, a town of Natolia; 20 miles N. of Elki-shehr.

KUIVAINEMI, a town of Sweden, in the government of Ulea; 20 miles E. S. E. of Tornea.

KUIVAMAKI, a town of Sweden, in the government of Wafa; 106 miles S. E. of Wafa.

KUKA, a town of Sweden, in the government of Abo; 32 miles S. E. of Biorneborg.

KUKALAR, a town of Sweden, in the government of Abo; 38 miles E. of Abo.

KUKERPEH, a town of Natolia; 32 miles W. of Boli.

KUKI, a town of Japan, in the island of Nippon; 70 miles N. of Meaco.

KUKKAISTENMAA, a small island on the E. side of the gulf of Bothnia. N. lat. 60° 53'. E. long. 21° 1'.

KUKU, an extensive country of Africa, bordering on the desert of Libya, and partaking of its nature. It lies to the N. E. of Tagua and Bornou, and on the N. E. joins to Al Wahat. Its capital of the same name is situated at 20 journees to the N. of Kauga, and about 250 miles N. E. of Bornou. N. lat. 21° 45'. E. long. 24° 45'. A river runs from N. to S. by Kuku, and is received into a lake at a great distance from it; perhaps the lake of Kauga; and the river itself may form a part of that, which is said to run near Angini, a city eight days' journey from Matthan, and six from Tagua, and towards Nubia and the Niger; consequently to the S. E. of Matthan, and apparently not far from the northward of Kauga.

KUKUS, a town of Bohemia, in the circle of Koninggratz, famous for its baths; 11 miles N. of Koninggratz.

KUL, or KOOL, a Turkish term, probably signifying a slave or servant.

Meminly tells us, the name is given to all the soldiers in the Ottoman empire, particularly to those of the grand

seignior's guard, and the infantry. The captains of the infantry, and those who command the guards, are called *kül zabıtları*, and the soldiers of the guard *kapu kulleri*, i. e. *slaves of the court*. Others inform us, that all who hold any places depending on the crown, or receive wages from it, in a word, all who are, in any measure, the grand seignior's servants, take the title of *kül*, or *cool*, i. e. *slave*, as more creditable than that of subject; even the grand vizir and the bashaws value themselves upon it. A *kül*, or slave, of the grand seignior, has authority to abuse any who are only his servants; but a subject, who should affront a *kül*, or slave, would be severely punished. The *küls* are entirely devoted to the will of the grand seignior, and look on it as a kind of martyrdom, that merits heaven, when they die either by his order, or in the execution of his commands.

KULALI, in *Geography*, an island of Russia, in the Caspian sea. N. lat. 45°.

KULB, a town of Austria; 10 miles S. S. W. of St. Polten.

KULBAEVA, a town of Russia, in the government of Upla; 48 miles E. of Menzclink.

KULDATZKOI, a town of Russia, in the government of Irkutsk, on the borders of China; 80 miles S. W. of Seleginsk.

KULEBAKINA, a town of Russia, in the government of Irkutsk, on the Lena; 20 miles S. of Kirensk.

KULEBRUN, a town of Prussia, in the province of Oberland; 12 miles S. of Elbing.

KULEBUGAGE, a town of Asiatic Turkey, in Carmania; 40 miles N. of Tarfus.

KULICHOW, a town of Austrian Poland, in Galicia; 10 miles N. N. E. of Lemberg.

KULING, a town of Grand Bucharia, in the kingdom of Balk; 30 miles N. E. of Balk.

KULLA, DAR, a small country of Africa, situated to the S. W. of Dar-Für. The natives of Kulla are partly negroes, and partly of a red or copper colour. Their language is nasal, but very simple and easy. It is said they worship idols. They are very cleanly, to which the abundance of water in their country contributes, and they are remarkable for honesty and even punctilious in their transactions with the Jelabs. They have ferry boats on the river, which are impelled partly by poles, partly by a double oar, like our canoes. Slaves are obtained in Dar-Kulla, either by violence, or by the following method. The smallest trespass on the property of another is punished, in this country, by enslaving the children or young relations of the trespasser. The least offence in this way is followed, after previous proof, by the forfeiture of a son, daughter, nephew, or niece of the offender to the person aggrieved. Accidents of this kind are continually happening, and produce a great number of slaves. A commission to purchase any thing in a distant market, not exactly fulfilled, is attended with a like forfeiture. But above all, if a person of note die, the family have no idea of death as a necessary event, but say that it is effected by witchcraft. To discover the perpetrator, the poorer natives, far and near, are obliged to undergo expurgation by drinking a liquor, which is called in Dar-Für "kilingi," or something that resembles it; and the person on whom the supposed signs of guilt appear, may either be put to death, or sold as a slave. The people of Kulla are strangers to venereal complaints, but are subject to the small-pox. In that part of the country that is visited by the Jelabs, there is a king; the rest is occupied by small tribes, each of which is ruled by the chief who happens to have most influence at the time. The "Kumba," or pimento tree, is found there in great plenty.

plenty, that a rotal or pound of falt will purchase four or five mid, each mid about a peck. The trees are so large, from the quantity of water and deep clay, that canoes are hollowed out of them of sufficient capacity to contain 10 persons. The Jelabs of Bergoo and Für sometimes journey to this country in order to procure slaves. The chief article they carry hither is salt, 12 pounds of which are estimated as the price of a male slave, about 12 or 14 years of age. A female brings three pounds more, whimsically computed by the natives, as a pound for the girl's eyes, another for her nose, and a third for her ears. If copper be the medium, two rotals are esteemed equal to four of salt. "Hoddür," a large fort of Venetian glass beads, and tin, are in great estimation. Of the latter they make rings, and other ornaments. Brown's Travels in Africa, p. 30, 8vo.

KULLA, a town of Sweden, in the province of Upland; 17 miles N. E. of Stockholm.—Also, a town of Sweden, in Abo; 10 miles E.S.E. of Björneborg.—Also, a town of Hindoostan, in Guzerat; 60 miles S.W. of Gogo.

KULLAPOLLAM, a town of Hindoostan, in the circuit of Guntoor; 32 miles N.E. of Mootapilly.

KULLAUT, a town of the kingdom of Candahar; 55 miles E. of Candahar.

KULLEN, a town of Sweden, in the province of Skone; 15 miles N. of Helsingborg.

KULLERWAH, a town of Hindoostan, in Gurry Mundella; 35 miles E. of Mundella.

KULLO, a country of Africa, E. of Konkodoo.

KULLOWGUY, a town of Africa, in the country of Kulo. N. lat. 12° 24'. W. long. 8 28'.

KULM. See CULM.

KULM, a town of Grand Bucharia, in the country of Balk; 30 miles N.E. of Balk.—Also, a town of Bohemia, in the circle of Leitmeritz; 9 miles S.W. of Kamnitz.—Also, a mountain of Dalmatia; 15 miles N. of Ragusa.

KULMALAX, a town of Sweden, in Tavastland; 31 miles N. of Tavasthus.

KULMEETA, a town of Algiers, on the left side of the Shellif, near its mouth; 6 miles N. of Mutlygannim.

KULSAGE, or SUGAR-*Teoua*, a little Cherokee town in the vale of Keowe.

KULSI, a river of Russia, which takes its rise in the government of Archangel, and falls into the White sea, in the district of the town of Mefensk.

KU-LONG-TCHAT, a town of the north coast of the island of Formosa. N. lat. 25° 16'. E. long. 121° 34'.

KULSUTANSKOI, a town of Russia, in the government of Irkutsk; 100 miles S.W. of Nertchinsk.

KUMADER, a town of Japan, in the island of Nippon; 10 miles N.E. of Moria.

KUMALA, a town of Sweden, in the province of Tavastland; 65 miles N.N.E. of Jamio.

KUMANO, a town of Japan, in the island of Nippon; 6 miles N.E. of Ixo.

KUMANT, a town of Japan, in the island of Nippon; 70 miles N.N.W. of Meaco.

KUMBO, a kingdom of Africa, near the mouth of the Gambia.

KUME JACUB, a town of Egypt; 16 miles S. of Girgê.

KUMEGAN, a town of Prussia, in the province of Samland; 16 miles N.W. of Konigberg.

KUMARA, in *Hindoo Mythology*, a name of KARTIKYA, which see.

KUMBA, and NIKUMBA, names of fiends, in Hindoo mythological legends, said by some accounts to have been destroyed by Krishna; according to others, by Kama,

KUMI, in *Geography*, an island in the East Indian sea, the most westerly in a cluster of six or seven others, from which it is separated by channels from eight to ten leagues wide, between Formosa and Japan, seen by M. la Perouse, who did not land upon it. These islanders are neither Japanese nor Chinese, but seem to be a mixture of both people. They were covered with a flurt and a pair of cotton drawers. Their hair, tucked up on the crown of the head, was rolled round a bodkin, which appeared to the voyagers to be gold. Each of them had a dagger, the handle of which was also gold. Their canoes were made of hollowed trees, and they were awkward in the management of them. Vessels that had been long at sea might procure wood, water, and provisions in this island, and also trade here in a small degree. But as it is scarcely three or four leagues in circumference, its population does not probably exceed four or five hundred. N. lat. 24° 33'. E. long. 123° 16'. Perouse's Voyage, vol. ii.

KUMINGE, a town of Sweden, in the government of Ulea; 11 miles N.E. of Ulea.

KUMISS, or KOUMISS, a kind of liquor made in Tartary, used by the natives as their common beverage, and often serving them instead of all other food. It is said to be so salutary and nourishing, that the Bashkirs, though emaciated in winter, return to the use of it in summer, and become strong and fat. The Russians have borrowed it from the Tartars, and use it medicinally. It is made with fermented mare's milk, according to the following receipt, communicated by Dr. Grieve in the Edinburgh Philosophical Transactions, vol. i. p. 181. as he obtained it from a Russian nobleman, who visited that part of Tartary where it is made, for the sake of the medical use of it:—"Take of fresh mare's milk, of one day, any quantity; add to it a sixth part of water, and pour the mixture into a wooden vessel; use then, as a ferment, an eighth part of the fourfold cow's milk that can be got: but at any future preparation, a small portion of old koumiss will better answer the purpose of souring; cover the vessel with a thick cloth, and set it in a place of moderate warmth; leave it at rest twenty-four hours, at the end of which time the milk will have become sour, and a thick substance will be gathered on the top: then with a stick, made at the lower end in the manner of a churn-staff, beat it till the thick substance above-mentioned be blended intimately with the subjacent fluid. In this situation, leave it again at rest for twenty-four hours more; after which pour it into a higher and narrower vessel, resembling a churn, where the agitation must be repeated as before, till the liquor appear to be perfectly homogeneous; and in this state it is called koumiss, of which the taste ought to be a pleasant mixture of sweet and sour. Agitation must be employed every time before it be used."—To this detail of the process the nobleman subjoined, that, in order to obtain milk in sufficient quantity, the Tartars have a custom of separating the foal from the mare during the day, and allowing it to suck during the night: and when the milk is to be taken from the mare, which is generally about five times a-day, they always produce the foal, on the supposition that she yields her milk more copiously when it is present.

To the above method of making koumiss, our author has added some particulars taken from other communications with which he was favoured by Tartars themselves. According to the account of a Tartar who lived to the fourth east of Orenbourg, the proportion of milk and souring ought to be the same as above; only, to prevent changing the vessel, the milk may be put at once into a pretty high and narrow vessel; and in order to accelerate the fermentation,

tion, some warm milk may be added to it, and, if necessary, more fousing.—From a Tartar whom the doctor met with at the fair of Macarieff upon the Volga, and from whom he purchased one of the leathern bags which are used by the Kalmucks for the preparation and carriage of their koumiss, he learned that the process may be much shortened by heating the milk before the fousing be added to it, and as soon as the parts begin to separate, and a thick substance to rise to the top, by agitating it every hour or oftener. In this way he made some in the doctor's presence, in the space of twelve hours. Our author learned also, that it was common among some Tartars to prepare it in one day during summer, and that with only two or three agitations; but that in winter, when, from a deficiency of mares' milk, they are obliged to add a great proportion of that of cows, more agitation and more time are necessary. And though it is commonly used within a few days after the preparation, yet when well secured in close vessels, and kept in a cold place, that it may be preserved for three months, or even more, without any injury to its qualities. He was told farther, that the acid fermentation might be produced by four milk as above, by a four parts of rye flour, by the rennet of a lamb's stomach, or, what is more common, by a portion of old koumiss; and that in some places they saved much time, by adding the new milk to a quantity of that already fermented; on being mixed with which, it very soon undergoes the vinous change.

It was according to the process first mentioned, however, that all the koumiss which the doctor employed in medicine was prepared. It has been found serviceable in hectic and in nervous complaints; and our author relates some very striking cases which the use of it had completely cured. All those who drank it, our author informs us, agreed in saying, that, during its use, they had little appetite for food; that they drank it in very large quantities, not only without disgust, but with pleasure; that it rendered their veins turgid, without producing languor; that, on the contrary, they soon acquired from it an uncommon degree of sprightliness and vivacity; that even in cases of some excess, it was not followed by indigestion, headach, or any of the symptoms which usually attend the abuse of other fermented liquors.

The utility, however, of this preparation as a medicine, supposing it completely ascertained, would among us, as our author observes, be greatly circumscribed by the scarcity of mares' milk in this country. "Hence," says he, inquiries will naturally be made, whether other species of milk admit of a similar vinous fermentation, and what proportion of spirit they contain. As these have never been the object, however, of my attention, I will here give the substance of what I have been able to learn from others respecting that which is the most common, the milk of cows.

"Dr. Pallas says, that cow's milk is also susceptible of the vinous fermentation, and that the Tartars prepare a wine from it in winter, when mares' milk fails them; that the wine prepared from cow's milk they call *aireu*; but that they always prefer koumiss when it can be got, as it is more agreeable, and contains a greater quantity of spirit; that koumiss, on distillation, yields of a weak spirit one third; but that *aireu* yields only two ninth parts of its whole quantity, which spirit they call *arika*.

"This account is confirmed by Oseretkowsky, a Russian, who accompanied Lepechin and other academicians, in their travels through Siberia and Tartary. He published lately a dissertation on the ardent spirit to be obtained from cow's milk.

"From his experiments it appears, that cow's milk may be fermented with, or even without, fousing, provided sufficient time and agitation be employed; that no spirit could be produced from any one of its constituent parts taken separately, nor from any two of them, unless inasmuch as they are mixed with some part of the third; that the milk with all its parts in their natural proportion was the most productive of it; that the clofer it was kept, or, which is the same thing, the more difficultly the fixed air is allowed to escape during the fermentation, (care being taken, however, that we do not endanger the bursting of the vessel,) the more spirit is obtained. He also informs us, that it had a fouler smell before than after agitation; that the quantity of spirit was increased, by allowing the fermented liquor to repose for some time before distillation; that from six pints of milk, fermented in a close vessel, and thus set to repose, he obtained three ounces of ardent spirit, of which one was consumed in burning; but that from the same quantity of the same milk fermented in an open vessel, he could scarcely obtain an ounce."

KUMLA, in *Geography*, a town of Sweden, in the province of Nericia; 7 miles S. of Orebro.—Also, a town of Sweden, in East Gothland; 10 miles S.S.W. of Nordkiöping.—Also, a town of Sweden, in Sudermanland; 25 miles W. of Stockholm.

KUMLINE, a small island in the Baltic, between the continent of Finland and the island of Aland, with a town upon it. N. lat. 60° 17'. E. long. 20° 37'.

KUMO, a town of Sweden, in the government of Abo, on a river of the same name; 23 miles S.E. of Björneborg.

KUMRI, a chain of lofty mountains in Africa, in which are the sources of the Nile and Bahr Kulla, lying, according to Browne, in N. lat. 7; and probably running across the continent.

KUMUK, a province bordering on the Caspian sea, part of the territory included between the rivers Terek and Kur, and lying between the Terek and Koifu, comprehends a fertile plain watered by these rivers, as well as the Akkai and Kafma, and the next adjoining mountains to the west. It is under the government of several Kumuk Begs, of whom the two most powerful reside in the cities Akkai and Endors, (called by the Russians Andrewka,) at the foot of the mountains; and is inhabited by the Kumuk and Nogai Tartars, and by Armenian and Georgian merchants, who dwell in the cities. In winter the Lefgians descend likewise with their herds from the mountains into the plain; for the liberty of doing which they pay a tribute. The Nogai Tartars keep numerous herds, and dwell in moveable felt-huts, near the walls and banks of the rivers and canals. The length of this province is about 11, and the breadth 8, German miles. The Kumuks are vassals to Russia.

KUNA, a town of Lithuania; 15 miles S.E. of Bracław.

KUNASSYR, one of the Kurile islands, 150 versts long, and 50 broad, and entirely surrounded by mountains with lofty summits; but in the middle of the island are low plains. Firs, larches, birch, &c. grow here. At the southern extremity, a flat sandy beach extends from the lofty mountains, where the sea brings up a species of pearl-bearing mussel in vast abundance; some of the size of a desert-plate. The island has lakes and broad streams that abound with fish. It is inhabited by Kurils, who are rated at 41 persons.

KUNCKEL, JOHN, in *Biography*, a celebrated chemist, was born at Hufum, in the duchy of Sleswick, in the year 1630. He was originally intended for the practice of pharmacy;

macy; but having applied himself with equal diligence to the study of chemistry and metallurgy, he obtained great reputation for his skill in these departments, and was appointed chemist to the elector of Saxony. He afterwards went to the court of Frederic William, elector of Brandenburg, with a similar appointment; and subsequently to that of Charles XI. king of Sweden, who gave him the title of confeller metallique; and, in 1693, granted him letters of nobility, under the name of Kunckel de Loewenstern. He was elected a member of the imperial Academia Naturæ Curiosorum, under the name of Hermes III. He died in Sweden, in March 1703.

Kunckel laboured in the practical pursuit of chemical knowledge for upwards of fifty years, and obtained an extraordinary skill in the art. His patrons defrayed the expence of all the operations which he chose to undertake; and, as director of the glass-works, he had many opportunities of exercising his talent of acute observation. His theoretical knowledge, however, was very imperfect: for it is allowed that he was altogether destitute of the least tincture of philosophy, and was even fabled to have been one of the searchers for the philosopher's stone. He is now principally known as the discoverer of *phosphorus*, which he prepared from urine, and which bears his name in the shops. He was the author of several works, written in German, in a very bad style, and with as little method as the rest of the alchemists. His treatise "On Phosphorus" was printed at Leipzig in 1678, and his "Art of Glass-making" in 1689. Two or three of his essays have been translated into Latin. Eloy. Dict. Hist.

KUNDAL, in *Geography*, a town of Bengal; 20 miles S.E. of Comillah.

KUNDALIAH, a town of Hindoostan, in Dowlatabad; 10 miles E.S.E. of Toolipour.

KUNDAWILSA, a town of Hindoostan, in Cicacole; 20 miles S.W. of Cicacole.

KUNDERA, a town of Hindoostan; 35 miles W. of Poonah.

KUNDJEH, a town of Turkish-Armenia, on the Euphrates; 65 miles S. of Erzerum.

KUNDOZERSKAIA, a town of Russia, in the government of Archangel; 128 miles S. of Kola.

KUNDRUTCHIA, a town of Russia, in the country of the Cossacks, on the Donetz; 68 miles N.E. of Azoph.

KUNGIPARA, a town of Hindoostan, in the subah of Delhi; 10 miles S.E. of Tannafar.

KUNGUR, a town of Russia, and district of the government of Perm, on the river Sylva; 40 miles S. of Perm.

KUNK, Congo, or CUNG, a sea-port town of Persia, in the province of Larilan, on the coast of the Persian gulf, opposite the island of Kishme; 60 miles S.E. of Lar. N. lat. 26° 44'. E. long. 54° 50'.

KUNNERSDORF, a town in the Middle Mark of Brandenburg, remarkable for a battle fought between the Prussians and the united forces of the Austrians and Russians, August the 12th, 1759; 3 miles E.N.E. of Francfort on the Oder.

KUNNIPOUR, a town of Hindoostan, in Benares; 15 miles E. of Merzapour.

KUNOE, one of the Faroer islands.

KUNOSY, a town of Lithuania, in the palatinate of Novogrodek; 34 miles E.S.E. of Novogrodek.

KUNOVATSKOI, a town of Russia, in the government of Tobolsk, on the Ob; 80 miles S. of Obdorskoi.

KUNOW, a town of Poland, in the palatinate of Sandomirz; 16 miles S.S.E. of Radom.

KUNTE, a town of Japan, in the island of Xicoco; 18 miles S. of Ijo.

KUNTZEN, a town of Prussia, in the province of Sannland, on the Curisch Neuring; 28 miles N. of Konigsberg.

KUNZEN, ADOLPH. CART., in *Biography*, born at Wittenburg in 1720, was an excellent performer on the harpsichord and organ, who in early youth, about the middle of the last century, came to England, where his masterly and powerful manner of treating these instruments, both as a performer and composer, may be still remembered with pleasure by those who heard him. On his return to Germany, he was appointed organist of Lubce, where he died in 1771.

KUOPIO, in *Geography*, a town of Sweden, and capital of Savolia, and that part of Carelia reserved to Sweden, formed into one province under the appellation of Hoedingedorne of Kuopio. The town stands on the west side of an extensive lake; 150 miles S.S.E. of Ulea. N. lat. 62° 54'. E. long. 27° 28'.

KUORTANE, a town of Sweden, in the government of Wafa; 52 miles E.S.E. of Wafa.

KUPENKA, a town of Russia, in the government of Voronetz; 128 miles S.S.W. of Voronetz.

KUPERPEH, a town of Natolia; 35 miles W.N.W. of Boli.

KUPFENBERG, a town of Bavaria, in the bishopric of Bamberg; 32 miles N.E. of Bamberg.—Also, a town of Bavaria, in the bishopric of Aichlstadt; 10 miles E.N.E. of Aichlstadt.

KUPFER NICKEL. See NICKEL.

KUPFERBERG, in *Geography*, a town of Silesia, in the principality of Jauer; 15 miles S.S.W. of Jauer. N. lat. 50° 40'. E. long. 15° 55'.—Also, a town of Bohemia, in the circle of Saatz; 22 miles W.S.W. of Saatz. N. lat. 50° 23'. E. long. 13° 5'.

KUPH, a decayed town of Syria, bearing amongst its ruins marks of ancient splendour. Its houses are constructed of yellow hewn stone; the walls are about eighteen inches thick, and are neither fastened with iron, nor laid in mortar. The houses are built round courts, and appear like palaces. Crosses over the doors indicate that they were erected by Christians; and from the style of architecture, Dr. Pococke supposes that it was about the fourth or fifth century; 35 miles S.S.W. of Aleppo.

KUPHE, a name given by Guettard to a petrification, the body of which is conical, the anterior part blunt, and the posterior part forked, while the interior is divided into two hollows or tubes.

KUPINATZ, in *Geography*, a town of Croatia; 14 miles E. of Carlsbad.

KUPISZKI, a town of Lithuania, in the palatinate of Troki; 30 miles S.S.E. of Birza.

KUPLIAGHISI, a town of Natolia; 16 miles S. of Sinob.

KUPPENHEIM, a town of Baden; 3 miles S.S.E. of Ralsbad.

KUPPOREAH, a town of Hindoostan, in the circar of Sirhind; 50 miles S.W. of Sirhind.

KUPRI, a river of Natolia, which runs into the gulf of Satalia. N. lat. 36° 59'. E. long. 37°.

KUPRIBAZARI, a town of Asiatic Turkey, in Caramania; 6 miles W. of Satalia.

KUPSINGA, a town of Hindoostan, in the circar of Gangpou; 10 miles S.S.W. of Gangpou.

**KUR**, a river of Asia, the ancient *Cyrus* (which see), rises in the Caucasian mountains, and pursuing a rapid course through Georgia, Schirwan, &c. falls into the Caspian sea, 70 miles S.S.W. of Baku. In the vicinity of this river the land is subject to inundations, and overgrown with high rich grass; towards the sea it is brackish and barren, but fertile towards the mountains. About 14 miles upwards from its mouth, the Kur receives from the right the Aras, or ancient Araxes; and there on the left bank is situated a large village, named Dschawat. After its junction with the Aras, the Kur is about 70 fathoms broad, and only so far navigable; the rocks in the bed of the river hindering the navigation higher up. At about four German miles from the sea, it branches out into a number of arms, the northernmost and southernmost of which are the most considerable. The islands thus formed belong to Schirwan. On the northern main arm lies the town of Sallian, which properly consists of a number of villages extending along the river, and owes its prosperity to the uncommonly productive fishery of the Kur; for this river abounds with sturgeon and other fish. Between the Kur and the Terek lies a tract of land, along the Caspian sea, extending in length from the 30th to the 44th degree of N. latitude, and of various breadth, though for the most part inconsiderable in proportion to its length. This tract contains somewhat more than 2500 French square miles, and is divided into three provinces, *viz.* *Kumak*, *Daghestan*, and *Schirwan*, of which the first is now dependent on Russia, and the two latter on Persia. See each respectively.

**KURA**, a small island in the Caspian sea, with steep shores round it. N. lat. 39°.

**KURABAD**, a town of Candahar; 8 miles W. of Attock.

**KURAGGI**, a town of Japan, in the island of Niphon; 45 miles N.N.E. of Jedo.

**KURCH**, a town of Natolia; 34 miles W. of Sinob.

**KURDIUM**, a town of Russia, in the government of Saratof, on the Volga; 16 miles N.N.E. of Saratof.

**KURGAN**, a town of Russia, and district of the government of Tobolsk, on the river Kurgan; 68 miles S.W. of Yalutorovsk.—Also, a river of Asia, which rises in Khorasan, and runs into the Caspian sea, W. of Altarabat.

**KURIAT**, a town of Arabia, in the country of Oman, at the mouth of a river of the same name, which runs into the Arabian sea, S. of cape Kuriah; 20 miles S.E. of Mascat.

**KURIAI**, *Capes*, or *Ros Kuriat*, a cape on the coast of Arabia. N. lat. 23° 27'. E. lon. 57° 50'.

**KURJAUN**, a town of Hindoostan, in the circar of Gohud; 25 miles S.W. of Gwalior.

**KURIKKA**, a town of Sweden, in the government of Wafsa; 36 miles N.E. of Christinelstadt.

**KURLA**, a town of Sweden, in East Bothnia; 20 miles S.W. of Brahetlad.

**KURLAUT**, a town of Kharafin; 60 miles S.S.E. of Urkonje.

**KURILE**, or **KURILSKOI**, *Islands*, a chain of islands, running in a S.W. direction from the southern promontory of the peninsula of Kamtschatka, or the Kurilloy Lopatka, to Japan, extending from N. lat. 51° to 45°. They obtained this name from the inhabitants of the neighbourhood of Lopatka, who being themselves called Kuriles, gave their own name to these islands, on first being called acquainted with them. Some of them are inhabited and wooded, others quite bare and rocky, and a few that are volcanic. According to Spanberg, they are 22 in number, without reckoning the small ones. Of the two Kurile islands that lie nearest to Lopatka, the first accounts were brought to

Russia in the year 1713. The others have been successively known from that period to 1779, by means of Russian mariners, who, at the time, put them under contribution to the crown. The 22 islands are Shoornthu or Shoornka, Poromufhir, or Paramoufir, Sherinki, Mikan-Kur-Afsey, Anakutan, Ar-Amakutan, Syakutan, Ikarma, Tshirinkutan, Mussfy, Rach-koke, Mutova, Rafagu, Uffalfy, Ketoi, Semuffyr, Tshirpa-Oi, Urup, or Ooroop, Etorpu, Kunaffyr, Tshikota, and Matmai. Anakutan is distant from the fourth island (in the order of enumeration) 35 versts; it is about 100 versts long and 15 broad; has three elevated summits of mountains, of which two have exhausted craters; the wood is scrubbed and scanty; red foxes are pretty numerous, but on the coast are few sea-beavers, &c. Several streams of hard water flow from it into the sea. From this Ar-Amakutan is distant six versts; its length is twenty versts and breadth ten; in the centre of the island is a rocky mountain, which was formerly a volcano, and towards the strait between it and the fifth island, on the eastern shore, stands another, which is reported to have been a burning mountain. This island is uninhabited, and is only visited by the Kurils, on account of the chace, as it abounds with foxes; and on the shores are sea-lions and sea-otters. Ikarma is about 12 versts from the seventh island, and is eight versts long. Upon it is a volcano, which occasionally emits flames; the shore is stony, presenting here and there a sulphureous spring. It has neither lakes nor streams; and with respect to wood and animals, it is in the same state with Syakutan. For an account of the other islands, see the respective articles. Of these 22 Kurile islands, the first 21 are subject to Russia; and all of these do not pay tribute. The islands are reported by their missionary, the pastor of Paratounca, who visits them once in three years, to be a friendly, hospitable, generous, humane race of people, and excelling their Kamtschadale neighbours, not less in the formation of their bodies than in docility and quickness of understanding. Of these islands it is said, that four only are inhabited, and their population is estimated at 1400 persons. The inhabitants are generally hairy, wear long beards, and live entirely upon seals, fish, and the produce of the chace. The more southerly and independent islanders sometimes pass in canoes the channel that separates them from the Russian Kuriles, in order to give some of the commodities of Japan, such as silk, cotton, iron, &c. in exchange for furs, dried fish, and oil. The inhabitants of as many of the islands as are brought under the Russian dominions are, at present, converted to Christianity; and probably the time is not very distant, when a friendly and profitable intercourse will be brought about between Kamtschatka and the whole of this chain of islands; which will be followed by a communication with Japan itself. These islands extend from N. lat. 42° to 51°. *Tocke's Russ. Emp. vol. i. Cook's Third Voyage, vol. iii.*

**KURISONDA**, a town of Asiatic Turkey, in Carmania; 60 miles N.N.E. of Tocat.

**KURISSIMA**, a town of Japan, in the island of Xicoco; 16 miles W. of Ijo.

**KURK**, a town of Candahar; 25 miles E. of Cabul.

**KURKIN**, a town of Bengal; 11 miles N.E. of Rangpur.

**KURKUMBA**, town of Hindoostan, in the circar of Ruttunpour; 32 miles E. of Ruttunpour.

**KURKUNA**, a town of Hindoostan, in the circar of Surgooja; 25 miles N.E. of Surgooja.

**KURKSTAT**, a town of Sweden, in the province of Nyland; 18 miles W. of Helsingfors.

**KURMA**. See **KORMA**.

**KURMAVATARA**, in *Mythology*, the second of the ten incarnations of the Hindoo god Vishnu, of which the following account is given in the Hindoo Pantheon. "The second grand avatara of Vishnu, in the form of a tortoise, evidently refers all to the deluge. In that of Matya, or the fish, (see **MATSYAVATARA**.) we find the necessity of a deluge to cleanse the world from his sinful taints. By the demon Hyagria having stolen the Vedas while Brahma was dozing, we must understand the dereliction of mankind from the doctrines and conduct prescribed in the scriptures, and the criminal indifference of their pastors. The preserving attribute of the deity interposed, saved a remnant of creatures from destruction, and by recovering the scriptures, reclaimed mankind to purity of faith and conduct. For the purpose of restoring to man some of the comforts and conveniences that were lost in the flood, Vishnu is fabled to have become incarnate again in the form of a tortoise; in which shape he sustained the mountain Mandara placed on his back to serve as an axis, whereon the gods and demons, the vast serpent Vafoky serving as a rope, churned the ocean for the recovery of the *amrita*, or beverage of immortality." (See **KETU**.) Plate 49, of the Hindoo Pantheon exhibits this process, where Vishnu is seen in his place with the two other great powers opposed to the Asuras, or demons; and appears again on the summit of the mountain, and again beneath it in the form of the tortoise. The history of this avatara forms an episode in the Mahabarat, and Mr. Wilkins has introduced a fine translation of it in his elegant version of the Gita, where, however, the metamorphosis of Vishnu into the tortoise is not directly mentioned. But such is the usual mode of telling and receiving the story, which is one of the most popular, both in recitation and painting, among the monstrous mass of subjects derived from the copious Pantheon of the Hindoos.

Kurma, or Koorma, is the Sanscrit appellation of the avatara. Among the Maharratas, and others in the western parts of India, it is more commonly called Katch, that word, or Katchiva, meaning, like Kurma, a tortoise or turtle. The result of the operation, in view to which the incarnation appears to have occurred, was obtaining from the churned ocean fourteen articles, usually called fourteen gems, or chaterdefa-ratana; in common language chawda-ratny; usually thus enumerated: 1. the Moon, Chandra or Soma; 2. Sri or Lakshmi, the goddess of fortune and beauty; 3. Sura, wine, or Suradevi, the goddess of wine; 4. Oochirava, an eight-headed horse; 5. Kustubha, a jewel of inestimable value; 6. Paryata or Pariyata, a tree that spontaneously yielded every thing desired; 7. Surabhi, a cow similarly beautiful; 8. Dhanvantara, a physician, or the god of physic; 9. Iravat, the elephant of Indra with three proboscis; 10. Shank, a shell conferring victory on any one who should sound it; 11. Danusha, an unerring bow; 12. Bikh, poison, or drugs; 13. Rheмба, a beautiful woman, corresponding in many points with our popular Venus; 14. The Amrita, or beverage of immortality, which appears, though last obtained, to have been the primary object of this churning process; the other gems appear to have been obtained incidentally.

Under most of the articles whose foreign names occur in this, some notice is taken of them, and we refer thither respectively and generally for farther information thereon.

**KURMDYA**, in *Geography*, a town of Bengal; 55 miles S.S.W. of Doofa.

**KURMUKI**, a town of the principality of Georgia; 105 miles S.E. of Teflis.

**KURMYK**, a town of Russia, and district of the go-

vernment of Simbirsk, on the Sura; 104 miles N.W. of Simbirsk.

**KUROPATNIKI**, a town of Austrian Poland, in Galicia; 45 miles E.S.E. of Lemberg.

**KUROSACKI**, a town of Japan, in the island of Ximo; 27 miles N. of Taifeiro.

**KUROW**, a town of the duchy of Holstein; 9 miles N.W. of Lubeck.

**KURRA**, a river of Hindoostan, which runs into the Beema; 32 miles N. of Vishapur.

**KURRABAGH**, a town of Candahar, in the province of Ghizni; 20 miles W.S.W. of Ghizni. N. lat. 33° 30'. E. long. 67° 50'.

**KURRERA**, a town of Hindoostan, in the circar of Gohud; 12 miles S.S.E. of Narwa.

**KURRIGOORA**, a town of Bengal; 45 miles S.S.W. of Doofa.

**KURRYA**, a town of Bengal; 30 miles S.E. of Palamou.

**KURSK**, a government of Russia, which was formerly part of that of Bielgorod; comprehending 16 districts: it is bounded on the N. by the government of Orel, on the E. by that of Voronetz, on the S. by Voronetz and Khar-kof, and on the W. by Tchernigof; about 112 miles from N. to S., and generally 100 from E. to W., extending, however, by a narrow part, about 12 miles wide, 40 miles further west.—Also, the capital of the above-mentioned government, on the river Tugar, which falls into the Sem or Sem. N. lat. 53° 40'. E. long. 36° 24'.

**KURSY**, a town of Hindoostan, in Candesh; 45 miles S.W. of Burhanpou.

**KURTACULAC**, a town of Afatic Turkey, in Aladulia; 25 miles S.E. of Adana.

**KURTAPOUR**, a town of Hindoostan, in Lahore; 10 miles S. of Jallindar.

**KURTCHI**, a order of soldiery among the Persians.

The word, in its original, signifies *army*, and is applied to a body of cavalry, consisting of the nobility of the kingdom of Persia, and the posterity of those conquerors, who placed Ismael Sophi on the throne. They are in number about eighteen thousand men.

Their commander is called *kut-bi baschi*, which was formerly the first post in the kingdom; equivalent to a constable in France.

**KURTUS**, in *Ichthyology*, a genus of the jugulares, consisting only of a single species, called *Indicus* from its being an inhabitant of the Indian seas. The body in this genus is carinated each side, the back elevated, and the gill-membrane furnished with two rays. The species known subsists on crabs and shells, or testaceous animals: the body is short, slender, golden, and appearing as if covered with silvery plates: the head is large, compressed, and obtuse; eyes very large, with black pupil, and iris above blue, beneath white; mouth large; jaws with numerous teeth; tongue short and cartilaginous; lateral line straight, and commencing above the pectoral fin; first ray of the dorsal and ventral fins hard, and two firm of the anal spinous.

**KURU**, in *Geography*, a town of Sweden, in the government of Abo; 63 miles E.N.E. of Biorneborg.

**KURU**, in *Hindoo Mythological Legends*, was the brother of Pandu, who was the father of the five heroes of the Mahabarat. Kuru had a hundred sons, whose contests with the Pandus are the subject of that poem, which is a continued allegory of the struggles between man's virtues and vices, personified in the offspring of the brothers. See **MAHABARAT**, and **PANDU**.

**KURUMA**, in *Geography*, a town of Japan, in the island of Ximo; 16 miles E.N.E. of Ikuu.

**KURYMA**, a town of Hungary; 12 miles N.E. of Szeben.

**KUSA**, in *Botany*, the species of *grafs poa cynosuroides*, esteemed by the Hindoos very sacred and mythical, and used by the Brahmins in many of their sacred or superstitious ceremonies. Among this race of fabulists some poetical legend exists, accounting, in their way, for every subject and allusion in their complex mythology and theogony. Of the kusa grafs this is related in the Hindoo Pantheon. "Some legends make Garuda the offspring of Kasyapa and Diti. (See KASYAPA.) This all-prolific dame laid an egg, which, it was predicted, would produce her deliverer from some great affliction: after a lapse of five hundred years, Garuda or Superna (see SUPERNA) sprang from the egg, flew to the abode of Indra, extinguished the fire that surrounded, conquered its guards, and bore off the amrita, (see KURMAVATARA,) which enabled him to liberate his mother, at that time afflicted in captivity. A few drops of this immortal beverage falling on the kusa, it became a grafs eternally consecrated; and some snakes, greedily licking up the ambrosia, so lacerated their tongues with the sharp blades of the grafs, that they have ever since remained forked; but the boon of eternity was insured to them also by their thus partaking of the immortality-conferring fluid. (See KETU.) This cause of snakes having forked tongues is still popularly, in the tales of India, attributed to the above greediness." P. 341.

**KUSAMO**, in *Geography*, a town of Sweden, in the government of Ulea; 85 miles E. of Tornea.

**KUSBAH**, a town of Hindoostan, in Benares; 22 miles W.N.W. of Benares.

**KUSCAN**, a town of Persia, in the province of Segeestan; 21 miles N.E. of Kin.

**KUSCARI**, a town of Mingrelia; 30 miles N.N.E. of Anarghia.

**KUSCHAIL**, a town of Russia, in the government of Tobolsk; 28 miles S. of Tomsk.

**KUSHA**, a town of Poland, in Podolia; 32 miles E. of Kamieniec.

**KUSHAL**, **KUSIEL**, or *Kubal*, a fortress of Asia, in Kuttore. N. lat. 35 17'. E. long. 70 39'.

**KUSHKAT**, a town of Great Bucharia; 72 miles W. of Kojend.

**KUSKO**, a town of the duchy of Warsaw; 18 miles W.S.W. of Kalitch.

**KUS-KHUSER**, a town of Persia, in Farfistan; 31 miles N. of Schiras.

**KUSMA**, a small town of Arabia, standing upon a high hill, in the province of Yemen, inhabited by free Arabs; 50 miles E. of Hodeida. The mountains, which extend far into the country, produce coffee.

**KUSSI**, a town of Japan, in the island of Nippon; 65 miles N.E. of Jedo.

**KUSSNACHT**, a bailiwick of Switzerland, in the canton of Zurich.—Also, a town of Switzerland, in the canton of Schweitz, near which is a chapel, erected on the spot where William Tell slew the Austrian governor; 10 miles W. of Schweitz.

**KUSSOOR**, a town of Hindoostan, in Lahore; 26 miles W.N.W. of Firozpour.

**KUSTANGI**, or **CHUSTENGI**, a town of European Turkey, in Bulgaria, on the Black sea, formerly called *Constantia*. N. lat. 44 30'. E. long. 28 37'.

**KUSTER**, **LUDOLPH**, in *Biography*, was born in 1670,

at Blomberg, in Westphalia, of which town his father was a magistrate. He studied under his elder brother at the Joachim college of Berlin, and was afterwards appointed tutor to the two sons of the count Schwering. On quitting that station, with a pension, he went to Frankfort on the Oder, and there published, in 1696, his "*Historia Critica Pomeri*." He was promised a professorship in the university of Joachim, and till that should be vacant he resolved to travel, and visited Leyden and Utrecht; at the latter place he delivered a course of lectures on the law of nations, and published his "*Bibliotheca Librorum*." He then went to England, and thence to France, for the purpose of collating MSS. for a new edition of Suidas. Having furnished himself with many very valuable materials and fragments for his work, from the king's library, he returned to England. Here he lived in great familiarity with Bentley and other learned men, and upon the publication of his work, which was printed partly at the expence of the university of Cambridge, he was honoured with the degree of doctor of laws. Several advantageous offers were made him if he would remain in England, but he was called back to Berlin, and installed in the professorship promised to him. The situation did not answer his expectations, he was rendered uncomfortable by disputes respecting his salary, and by having incurred the suspicion of being addicted to the principles of Ariamism, so that in a short time he found it expedient to retire to Amsterdam. Here he was reduced to absolute poverty by the failure of his banker. He afterwards went to Antwerp, embraced the Catholic religion, and was rewarded by a pension from the king, and with an admission into the Academy of Inscriptions. He died at the age of forty-six. He was a great master of the Latin tongue, and wrote well in it; but his chief excellence was his skill in the Greek language, to which he almost entirely devoted himself. Besides the works already referred to, he published "*Jamblicus Porphyrius*, et Anonymus apud Photium de Vita Pythagoræ." A new edition of Dr. Mill's Greek Testament. "*Aristophanes Gr. et Lat.*" "*De vero usu verborum medicorum*," which has been much esteemed as a grammatical treatise.

**KUSTUBHA**, in *Hindoo Legends*, is an inestimable gem, of which many wonderful tales are related. It is one of the fourteen precious things recovered from the ocean when churned for the amrita, by gods and demons, in the *Kurma-vatara*; which see.

**KUTALI**, in *Geography*, a small island, in the sea of Marmora. N. lat. 40° 30'. E. long. 27° 22'.

**KUTAN**, a town of Hindoostan, in Oude; 30 miles E. of Kairabad.

**KUTATS**, a town of Japan, in the island of Nippon; 25 miles E. of Meaco.

**KUTINA**, a town of Sclavonia; 33 miles W.N.W. of Pofzega.

**KUTSCHINA**, a town of Servia; 16 miles S.S.W. of Orfova.

**KU-TSING**, a city of China, of the first rank, in the province of Yun-nan; surrounded with mountains, about which the soil is fruitful. Its jurisdiction comprehends five towns of the second class, and two of the third. The inhabitants are industrious in cultivating the ground. N. lat. 25 34'. E. long. 103 27'.

**KUTSKOI**, a town of Russia, in the government of Irkutsk, on the Kuta, where it joins the Lena; 60 miles E. of Ilmsk. N. lat. 56 40'. E. long. 123 20'.

**KUTTENBERG**, or **KUTNA-HORA**, a town of Bohemia, in the circle of Czaflau, famous for its silver mines, formerly

formerly abundant, discovered by a monk in 1237; 4 miles N.W. of Czasslau. N. lat.  $49^{\circ} 52'$ . E. long.  $15^{\circ} 16'$ .

**KUTTPORE**, a tract of country between the N.E. part of Cabul, and the N.W. of Cachemire, now subject to Candahar. This tract borders on the N. of Sewad, Bijore, Puckholi, &c. It has obtained from the Mahometans the name of *Cafcrijan*, or land of infidels, and is classed by the people of Hindoostan as a dependency of Cashgar. It occupies nearly the place of Ptolemy's *Comedi*, and answers to it in description, being entirely mountainous. An author, cited by Rennell, states that Kuttore contains a great number of towns and villages, and is exceedingly populous. Its principal towns are Towkul, called also Showkul, and Jour-kul; these being the residences of its rulers. It abounds in fruits, such as grapes, plumbs, &c. It likewise yields rice, wheat, and other sorts of grain. The natives are exceedingly fond of wine and hog's flesh; although their country is well-stocked with cows and goats. They have a distinct language not at all resembling that of any other people; and their arms consist of the bow and arrow, the sabre and the sling. Another author says, that they are, for the most part, idolaters; that they are of a robbul make, and that their complexion is a mixture of red and white.

**KUTTPORE** is also a town and fortrefs in the above described country; 100 miles N.E. of Cabul. N. lat.  $35^{\circ} 27'$ . E. long.  $70^{\circ} 17'$ .

**KUTTRY**. See RAJPOOTS.

**KUTTUHDUA**, a small island in the bay of Bengal, near the coast of Aracan, inhabited chiefly by fishermen. It is well wooded. N. lat.  $21^{\circ} 52'$ . E. long.  $91^{\circ} 45'$ .

**KUTUM**, a town of Hindoostan, in Benares; 10 miles N.E. of Bidrigur.

**KUTZABAR**, a town of Persia, in Mazanderan; 40 miles S.W. of Fehrabad.

**KUVA**, a small town of Persia, S. of Derbent; the residence of a khan.

**KUVERA**, in *Hindo Mythology*, is the regent of wealth, corresponding with the Plutus of the western Pantheon. He is described, in respect of externals, as a mere man, gloomy, selfish, and deformed; but as a magnificent deity, residing in the splendid city Alaka, and borne through the sky in a gorgeous car, called *pushpaka*, or flowery. He is also called Viteffa, Paulastya, and Dhanada; and as the son of a sage named Vifrava, he is called Vifravana, a name likewise of Ravena, half brother, by the same father, of Kuvera. (See RAVENA.) His servants and companions are the Yakhas and Guhyakas, into whose filthy forms transmigrate the souls of those men who in this life are addicted to fordid and base passions, or absorbed in worldly prosperity. The term Guhyaka is derived from *guh* (ordure) a word retained in several dialects. He has a consort named *Kauseri*, which see; but neither would be invoked by a Hindoo, for the boon of riches, but *Lakshmi*, which see.

The Hindoos have assigned regents to each cardinal and intermediate point of the compass. (See MARUT.) Kuvera rules the north.

**KUWANA**, or **QUANO**, a sea-port of Japan, in the province of Owari.

**KUYALI**, a town of European Turkey, in Romania; 27 miles E.S.E. of Philippopol.

**KUYNDER**, a sea-port town of Holland, in Friesland, on the W. side of the river of the same name, at its entrance into the Zuyder see; 23 miles S. of Lewardan. N. lat.  $52^{\circ} 43'$ . E. long.  $5^{\circ} 46'$ .

**KUYP**, or **CUYP**, **ALBERT**, in *Biography*, a painter who ranks among the best and most original artists. He was born at Dort in 1606, and was the son of Jacob Gerritz

Kuyp, a landscape painter of much merit. From his father he first learnt the rudiments of the art; but surpassed him infinitely in his progress. He was one of the most agreeable painters that ever lived; imitating with the greatest perfection the purity and brilliancy of light. No artist ever represented the atmosphere which surrounds all objects more completely than Cuyp; not even Claude: and in the effect of sun-shine, none ever approached him. The simplest scenes and combinations of objects were sufficient for him to exert his talents upon; and he never failed to give an interest to them by the sweetness of his colour, and the beauty of his light and shade.

Little or nothing is known of his life. His works are numerous, and therefore he must have lived long; for they are of so highly finished a quality that he must have given much time to them.

In the various collections among the nobility in England, works of his shine with almost unrivalled lustre; and are not very uncommon. At the marquis of Stafford's is a very fine one of the landing of prince Maurice at Dort. There are also several others of great merit.

**KUZNETCHICA**, in *Geography*, a town of Russia, in the government of Simbirsk, on the Volga; 16 miles N.E. of Simbirsk.

**KUZNETZK**, a town of Russia, and district of the government of Saratof, seated on a rivulet, falling into the Sura; 96 miles N.N.E. of Saratof.

**KUZNETZK**, a town of Russia, and district of the government of Kolyvan, situated on the river Tom, opposite to the mouth of the Kondama; built in 1618, on a place whither the Tartars generally retired, and colonized from Tomsk, and some other towns. It contains about 300 houses, and the inhabitants are chiefly employed in the manufacture of iron; 188 miles E.S.E. of Kolyvan. N. lat.  $53^{\circ} 40'$ . E. long.  $86^{\circ} 49'$ .

**KUZNETSKOI MOUNTAINS**, a range of mountains, forming one of the sub-divisions of the Russian share of the Altaian mountains, the other being the Oby and the Yenisey. See ALTAI.

**KUZNIK**, a town of Russia, in the government of Viatka; 48 miles S.S.W. of Glazov.

**KUZOMEN**, a town of Russia, in the government of Archangel, on the coast of the White sea; 124 miles N.W. of Archangel.

**KUZREKA**, a town of Russia, in the government of Archangel, on the N. coast of the White sea; 140 miles S.S.E. of Kola.

**KWASSITZ**, a town of Moravia, in the circle of Hradisch; 14 miles N. of Hradich.

**KWASSOWA**, a town of Poland, in Volhynia; 28 miles N. of Zytomiers.

**KYANITE**, or **CYANITE**, Wern.; *Dijshene*, Haüy; *Sappare*, Sauffure. Other names derived from fancied resemblances, are blue-floril, blue talc, blue mica, foliated beryl, sapphir spar, blue feldspar, &c. Haüy's name implies the power this substance possesses of acquiring both vitreous and resinous electricity; all the other denominations are expressive of its characteristic.

Colour, which is generally azure-blue, light Prussian blue, or smalt-blue; but it is also seen blueish-grey, milky, greyish and greenish-white, and more seldom scaldon, and other shades of blueish-green. These colours are either uniform or mixed: the blueish-grey, striped or flamed with various shades of Prussian blue, is the most common mixture.

It occurs massive, disseminated in blunt-edged pieces, and crystallized. The following are the modifications we are acquainted with: 1. The oblique quadrangular prism, (which

(which appears also to be the primitive form of this substance,) with two opposite sides very narrow, which give the crystal a contracted tabular form. 2 The lateral edges formed by the acute angles of the preceding crystals, intercepted each by a plane, or truncated: this plane is generally very narrow. 3. The lateral edges formed by the obtuse angles of N 1, intercepted each by a plane, or truncated. This modification appears to be very scarce. 4. Four of the terminal edges of N<sup>2</sup>, intercepted each by a plane, which, if they met in a point, would form a four-sided pyramid. This we have observed in a small crystal included in rock-crystal.

These crystals, especially those from Mount St. Gothard, are not infrequently seen as twin-crystals, or macles.

They are mostly middle-sized, but also small, and very small; and occur imbedded, either singly, or in groups, intersecting each other. They are not infrequently seen curved and twisted, as if they had sustained pressure, when not yet hardened.

The internal, and generally also the external lustre of the cyanite is shining and splendid; it is a perfectly pearly lustre.

The longitudinal fracture of the crystals is foliated, with two-fold cleavage, one of which is much more distinct than the other. In the uncrystallized varieties the fracture is broad, straight, or curved-radiated, sometimes passing into foliated. The fragments are splintery, wedge-shaped, or even approaching the rhomboidal figure. The wedge-shaped distinct concretions, in which it occurs, are often grown together in all directions.

The massive cyanite is faintly translucent; but the crystals are often perfectly transparent: refraction simple.

It is semi-hard, nearly soft; a steel needle easily scratches the broad planes of the crystals, but not the narrow and truncating planes.

It is slightly flexible, but not elastic: and easily frangible.

Its specific gravity is stated to be 3.517 by Saussure, 3.622 (the Siberian) by Herrmann, and 3.092 (the bluish-grey var. from Tyrol) by Kirwan.

The following are the results of the analyses made of this substance.

	Saussure, fen.	Saussure, jun.
Silica	12.81	29.2
Alumine	66.92	55.0
Lime	1.71	2.25
Magnesia	13.25	2.0
Oxyd of iron	5.48	6.65
Loss and water	0.0	5.0
	100.17	100.

	Struve.	Herrmann.
Silica	51.5	23
Alumine	5.5	30
Lime	4.0	3
Magnesia	30.5	39
Oxyd of iron	5.0	2
Loss and water	4.5	3
	100.	100

The two following analyses differ from the preceding, particularly in the absence of magnesia and lime:

	Laugier.	Klaproth.
Silica	38.5	43.
Alumine	55.5	55.50
Lime	0.5	0.0
Oxyd of iron	2.75	0.50
Loss and water	2.75	Soda a trace

Cyanite is infusible before the blow-pipe, a property which, according to Saussure, renders it a convenient support for fubstances to be tried by that instrument.

This substance is found only in primitive mountains, imbedded in mica slate and talc slate, accompanied by granitic or fluoritic and garnets, with new and then iron ochre, iron pyrites, calcareous spar, &c. In Moravia and Saxony it occurs in small groups imbedded in a variety of a primitive rock called weils-lein, or white-stone.

Its principal localities are Switzerland (especially at Airolo, on the fourth side of Mount St. Gothard); Salzburg and Tyrol (in the Zillertal); Carinthia (on the Sau-Alpe); Scotland (Aberdeenshire, near Banclachy, and in the Mainland, one of the Shetland islands); France (in the neighbourhood of Lyons); it has also been found in Norway, in Siberia, in Brazil, &c.

When cut and polished it resembles in colour some varieties of sapphir, and specimens of it are sometimes exhibited under this name; but, not to mention the striae always observable in the interior of cyanite stones, their inferior lustre, and comparative softness, will soon clear up all doubts respecting their nature.

Saussure has endeavoured to introduce the name *Sappare* for this mineral, and he tells us, that in Scotland it is known by that appellation. Some authors have lately criticized this name as being derived from the bad pronunciation of the word *Sapphir*, with which the cyanite is said to have been confounded by the person who pointed it out to Saussure: but this is a mistaken notion, the name *sappare* being known to occur in several old works on mining; and as it appears to have been a very vague sort of name, it is not improbable that it may also have included the subject of this article.

KYBAR, in *Geography*, a town of Norway; 6 miles S.W. of Wardhus

KYBURG, a bailiwick of Switzerland, in the canton of Zurich.

KYDREBAD, a town of Hindooistan, in Oode; 8 miles N.E. of Fyzabad.

KYHOLM, a small island of Denmark, near the island of Samsoe.

KYL, a town of Sweden, in the province of Warmeland; 25 miles S.E. of Carlstadt.—Allo, a town of Sweden, in the province of Nericia; 8 miles N.W. of Orebro.

KYLA, a town of Sweden, in Warmeland; 23 miles S.W. of Carlstadt.

KYLE of *Durness*, a bay on the N. coast of Scotland, at the mouth of the river Durness: the entrance, W. of Farout head, is in N. lat. 58° 40'. W. long. 4° 42'.

KYLE of *Rhea*, a narrow strait between the island of Sky, and the main land of the county of Inverness. N. lat. 57° 15'. W. long. 5° 40'.

KYLE *Scotic*, a bay on the W. coast of Scotland, and county of Sutherland. N. lat. 58° 16'. W. long. 5° 5'.

KYLE of *Tongue*, a bay on the N. of Scotland, and county of Sutherland; 13 miles W.S.W. of Strathly-head. N. lat. 58° 35'. W. long. 4° 13'.

KYLLINGIA, in *Botany*, so called by Rottböll, in memory of his countryman, Peter Kylling, a Dane, who, in 1688, published at Copenhagen, the *Friidarium Danicum*, which is a catalogue in Latin, Danish, and German, of the native

native plants of Denmark, making 174 quarto pages.—Rottb. Gram. 12. Linn. Fil. Nov. Gram. Gen. 24. t. 1. Am. Acad. v. 10. 2. 24. t. 1. Suppl. 11. Schreb. 40. Willd. Sp. Pl. v. 1. 256. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 125. Brown. Prodr. Nov. Holl. v. 1. 218. Juff 27 Lamarck Illustr. t. 38. — Clafs and order, *Triandria Monogynia*. Nat. Ord. *Calamaria*, Linn. *Cyperoides*, Juff.

Gen. Ch. *Flowers* aggregate, in an oblong fealy head. *Cal.* Glume of two unequal valves, compressed, nearly single-flowered, single-seeded; valves lanceolate, channelled, acute, much shorter than the corolla. *Cor.* Glume of two unequal valves, compressed, larger than the calyx, keeled, spreading; the larger lanceolate, folded, very acute, embracing the smaller. *Stam.* Filaments three, awl-shaped, flat; anthers terminal, linear, erect. *Pist.* Germen superior, obovate, compressed, gibbous at one of its edges, without any bristles at the base; style thread-shaped; stigmas two or three, capillary. *Peric.* none, except the permanent corolla. *Seed* oblong, triangular, beardless.—The same calyx sometimes contains also either a male or a neutral flower.

Eff. Ch. *Flowers* aggregate, in an oblong, imbricated, head. Calyx of two valves. Corolla of two valves. Seed without bristles at the base.

This genus, adopted from Rottböll by the younger Linæus, had by his father been confounded with *Schoenus*, which its flowers in some measure resemble; but the habit, especially the aggregate, long, floral leaves, are akin to *Cyperus*. In the *Supplementum* four species are defined; Willdenow has eight; and a new one, *K. intermedia*, is described by Mr. Brown in his *Prodromus*, as found at Port Jackson, New South Wales.—They are all natives of warm countries, chiefly in the East or West Indies, and moist situations. Their roots seem to be perennial. Their herbage is slender. Stem simple, triangular, striated, and roughish. Leaves narrow, rough-edged. Heads pale or whitish, terminal, usually sessile, among the floral leaves, either solitary or several together, roundish or oblong, consisting of numerous, small, densely crowded flowers, whose glumes are more or less ribbed or striated, destitute of awns.

Examples of this genus are,

*K. monocephala*. Rottb. Gram. 13. t. 4. f. 4. (*Schoenus coloratus*; Linn. Sp. Pl. 64.)—Stem slender, triangular. Head globose, sessile, solitary. Floral leaves three, very long.—Native of both Indies. *Root* creeping. *Stems* solitary, a span high, bearing two or three leaves at the base, and three as long at the top, accompanied sometimes by a smaller one. The head of *flowers* is scarcely bigger than a large pea, whitish, very dense.—*Thryocophalon nenorale* of Forster, from Otaheite, appears to be precisely this plant.

*K. triceps*. Rottb. Gram. 14. t. 4. f. 6. (*Scirpus glomeratus*; Linn. Sp. Pl. ed. 1. 52. *Schenus niveus*; Syst. Veg. ed. 13. 81.)—Heads of both three together, clustered, sessile, somewhat ovate.—Native of both Indies. Rather larger than the last, of which, in the 2d edition of *Species Plantarum*, it is made a variety, but it is a smoother plant, and the clustered rather less globular heads distinguish the present species.

*K. incompleta*. Jacq. Coll. v. 4 101. Ic. Rar. t. 300.—Umbel compound. Spikes numerous, cylindrical. Calyx of one valve.—Native of the Caraccas. This is a very large species, with a sharply triangular stem three or four feet high, very long floral leaves under the general umbel, and many small leaves under the partial ones. The numerous clustered heads, or rather spikes, are oblong, various in

size, greenish, of numerous spreading flowers, whose calyx, according to Jacquin, has but one valve.

*K. monocephala*, *triceps*, and *umbellata*, are cultivated in the flowers at Kew, where they flower in summer or autumn, but probably excite little attention, except among curious botanists.

KYLY, or KYELA, in *Geography*, a sea-port on the W. coast of the island of Celebes, with a spacious harbour. S. lat. 1 15.

KYMITS, an island in the Baltic, near the coast of Finland; 20 miles long, and from one to two broad. N. lat. 60 16.

KYMMEN, a river of Finland, which flows from the lake of Pejend, or Pejma, into the centre of the gulf of Finland.

KYNE, a town of Sweden, in East Bothnia; 18 miles N.E. of Wafa.

KYNETON. See KINETON.

KYNOFO, a lake of Russia, in the government of Olo-netz, about 48 miles long, and from 12 to 16 broad. N. lat. 65 40. E long. 28 40.

KYPER, ALBERT, in *Biography*, a physician, was born at Konigsberg, in Prussia, and probably took the degree of M. D. at Leyden, where he was studying in the year 1642. He was afterwards chosen first professor of physic, in the new medical school established at Breda in 1646: but he quitted this station two years afterwards, in order to take possession of a medical chair, to which he was elected, at Leyden; an appointment which he held till his death, which occurred in September, 1655, at the time when he was rector of that university. He published several works. "Methodus Medicinæ ritè discendi et exercendi," Leyden, 1642. "Institutiones Physicæ," *ibid.* 1647. "Anthropologia, corporis humani contentorum, et animæ naturam et virtutes, secundum circulearem sanguinis motum, explicans," *ibid.* 1647, &c. "Institutiones Medicæ ad hypothesein de circulari sanguinis motu compoſitæ;" Amſterdam, 1654. "Collegium Medicum, xxvi. Disputationibus breviter complectens quæ ad Institutiones pertinent," Leyden, 1655. This volume contained also some miscellaneous and political tracts. Eloy. Dict. Hist. de Med.

KYPHONISM, KYPHONISMUS, or *Cyphonismus*, an ancient punishment, which was frequently undergone by the martyrs in the primitive times; wherein the body of the person to suffer was anointed with honey, and so exposed to the sun, that the flies and wasps might be tempted to torment him. This was performed in three manners; sometimes they only tied the patient to a stake; sometimes they hoisted him into the air, and suspended him in a basket; and sometimes they stretched him out on the ground, with his hands tied behind him. The word is originally Greek, and comes from *κῦρῶς*, which signifies either the *stake* to which the patient was tied, the *collar* fitted to the neck, or an *instrument* wherewith they tormented him; the scholiast on Aristophanes says, it was a wooden lock, or cage; and that it was called so from *κῦρῶς*, to *crook* or *bend*, because it kept the tortured in a crooked bowing posture; others take the *κῦρῶς* for a log of wood laid over the criminal's head to prevent his standing upright; Hefychius describes the *κῦρῶς* as a piece of wood, whereon criminals were stretched and tormented. In effect, it is probable the word might signify all these several things. It was a general name, whereof these were the species.

Suidas gives us the fragment of an old law, which punished those who treated the laws, with contempt, with *kyphonism* for the space of twenty days; after which they were to be precipitated from a rock, dressed in women's habit.

KYRA, in *Geography*, a town of Hindoostan, in Rohilcund; 20 miles S. of Budavoon.

KYRADAW, a town of Hindoostan, in Malwa; 7 miles S.W. of Kimlaffa.

KYRADEE, a town of Bengal; 14 miles W.S.W. of Curruckdeagh.

KYRALFALVA, a town and castle of Hungary; 12 miles S.W. of Sivat.

KYRANTY, a town of Bootan; 60 miles S. of Taffadon.

KYREZYCE, a town of Poland, in the palatinate of Volhynia; 56 miles N.W. of Zytoniers.

KYRIE, in *Ecclesiastical Music*, the first word of every mass in music. It furnishes, with *elision*, the only articulations of the first movement of all masses ancient and modern. *Kyrie*, the vocative case, implies O Lord, and joined with *elision*, is equal to "Lord have mercy on us." *Kyrie*, in speaking of a mass in music, is often used substantively, as "there is a well written *kyrie* in that mass or service."

KYRILA, in *Geography*, a town of Sweden, in East Bothnia; 36 miles E.N.E. of Christianstadt.

KYRITZ, a town of Brandenburg, in the Mark of Pregelitz; 40 miles N.W. of Berlin. N. lat. 52° 26'. E. long. 12° 26'.

KYRKAS, a town of Sweden, in the province of Jamtland; 7 miles N.E. of Otterfund.

KYRKSTATT, a town of Sweden, in the province of Nyland; 16 miles W. of Helsing.

KYRO, a town of Sweden, in North Finland, on a lake of the same name; 42 miles E. of Biorneborg.

KYRO, *Lille*, a town of Sweden, in East Bothnia; 12 miles E.S.E. of Wafa.

KYRO, *Stor*, a town of Sweden, in East Bothnia; 20 miles S.E. of Wafa.

KYSCHAW, a town of Prussia, in Pomerelia; 32 miles S.E. of Dantzic.

KYSTIS, *Kyris*, in *Anatomy*. See *CYSTIS*.

KYTEE, in *Geography*, a town of Bengal; 12 miles S. of Burdwan. N. lat. 23° 3'. E. long. 88°.—Also, a town of Hindoostan, in Bahar; 28 miles S.S.W. of Arrah.

KYTEKIEHL, or KYTZBUNL, a town of the county of Tyrol; 45 miles N.E. of Inspruck.

KYUQUOT, a large sound or bay on the N.W. coast of N. America, having on one side of it Robert's island. N. lat. 50°. W. long. 127° 20'.

KZILKAN, a town of Asiatic Turkey, on the Tigris; 21 miles N. of Teerit.

KZIKEN, a town of Asiatic Turkey; 15 miles W. of Merdin.

## L.

**L**, EL, a semi-vowel, or liquid consonant, making the eleventh letter of the English alphabet, and always preserving the same sound.

The *l* is pronounced by applying the tongue to the palate.

Pafferat observes, that *l* was frequently used among the ancients for *b*, as in *cillibe* for *cibillz*; for *d*, as *alipe* for *alipse*; for *c*, as *mutila* for *mutica*; for *n*, as *arvilla* for *arvina*, *belle* for *bene*, *colligo* for *colligo*; for *r*, as *fratellus* for *frater*, *balatrones* for *baratones*; for *s*, as *ancille* for *an* and *cesum*, *equitio* for *equiso*; for *t*, as *equifelis*, for *equifetis*, *Thelis* for *Thetis*. See *B*, *T*, &c.

The *ll* is a modern contrivance, and was never used among ancient Roman authors: they wrote *allium*, not *allium*; *macellum*, not *macellum*; *polucere*, not *pollucere*.

The *ll* of the Greeks was sometimes changed by the Romans into *ll*, as in *αλλουσι*, *salio*; *αλλος*, *alios*; *φωλλος*, *folium*; *r* has also been turned into *ll*; as *bira*, *illa*; *farare*, *fatullare*; &c. and *l* into *x*, or *xill*; as *ala*, *axilla*; *mala*, *maxilla*; *velum*, *vesillum*; *d* was also used for *ll*, *n* for *ll*, and *r* for *l*. See *R*, &c.

*l* is also frequently used instead of *d*, as in *Ulyffis*, from the Greek *Ὀδυσσεύς*, in that Æolic dialect *Ἰδυσσεύς*. Thus

also for *dautia*, we say *lautia*; for *dacrumis*, *lacryme*, &c. See *D*.

There are several people, for instance, the Chinese in Asia, the Illinois in America, &c. who cannot pronounce the *r*, but always change it into *l*. Thus, when any of them have been baptized by the name of *Petrus*, *Franciscus*, &c. they always pronounce it *Pellus*, *Flanciscus*, &c. See *R*.

Among the Saxons the *l* was aspirated, and the Spaniards and Welsh usually double it at the beginning of a word, which sounds nearly the same with our *hl* or *fl*. At the end of a monosyllable it is always doubled, except after a diphthong. The monosyllables in which it is doubled, as *kill*, *vill*, *full*, were originally written *kille*, *ville*, *fulle*, and when the *e* first became silent, and was afterwards omitted, the *ll* was retained, to give force, according to the analogy of our language, to the foregoing vowel. In a word of more syllables it is written single. It is sometimes inserted before *e*, and sounded feebly after it, so as to be almost mute; as *table*, *fluttle*.

The figure of our *L* borrowed from the Latins, they from the Greeks, and they again from the Hebrews, whose

lamed is much like our L, excepting that the angle is somewhat more acute.

L was also a numeral letter among the ancients, and is still so in the Roman cyphering, signifying *fifty*; according to the verse,

“Quinquies L denos numero designat habendos.”

When a dash was added at the top, thus,  $\bar{L}$ , it stood for *fifty thousand*.

L was used for fifty, being half a C, which signified a hundred, and was formerly written thus L, which, according to Pasquiere, makes two LL, the one upright, the other inverted.

The French Louis-d'ors have a cross on them, consisting of eight L's interwoven, and disposed in form of a cross. The letter L is marked on the money coined at Bayonne. The epochs on Greek medals are usually written with the ancient *lambda*, L; which, according to the tradition of the antiquaries, stands for *Λυσις*, a poetical word, unknown in common speech, signifying *anno*, and which it is probable was more used in Egypt than Greece.

L as an abbreviation stands for Lucius; and LLS. for a *sterlinge*. In English, it denotes a pound sterling.

LA, in *Music*, is the sixth found of the Guido scale. See GAMMUT, and SOLMISATION.

LAAB, or LAVA, in *Geography*, a town of Austria, on the river Taya; 26 miles N. of Vienna. N. lat. 48° 39'. E. long. 16° 16'.

LAADSTEE, a town of Norway; 112 miles N. of Bergen.

LAAGE, a town of Mecklenburg; 14 miles S.E. of Rostock. N. lat. 55° 58'. E. long. 12° 30'.

LAALAND, or LALAND, an island of Denmark, situated at the entrance into the Baltic, from the Great Belt; about 50 miles long, and 20 in its medial breadth, and reckoned the most fertile spot in the Danish dominions. It produces variety of grain, particularly wheat, and also pease; and is chiefly appropriated to the cultivation of corn. Its woods, in which it is not deficient, are more frequent in the east, than on the west side of the island. As its situation is low, the air is damp and the climate is insalubrious. Of all the inhabitants, the clergy are most liberally provided for, according to their rank. The nobility are numerous, and possess large estates with fine houses. This island, like Tealier, has a peculiar governor; but both are under the spiritual jurisdiction of the bishop of Funen. The capital is Naskow. N. lat. 54° 40' to 55°. E. long. 10° 59' to 11° 52'.

LAALGUNGE, a town of Hindoostan, in Oude; 25 miles E. of Manichpour.

LAARET, an island in the East Indian sea, about 50 miles in circuit. S. lat. 6° 48'. E. long. 132° 36'.

LAAS, or LOSCH, a town of Carniola, with a citadel; 23 miles E. N. E. of Trieste. N. lat. 45° 58'. E. long. 14° 25'.

LAASPHA, or LASPA, a town of Germany, in the county of Witgenstein; 64 miles E. of Cologne. N. lat. 50° 53'. E. long. 8° 30'.

LAB, a town of Germany, in the bishopric of Wurzburg; 6 miles E.S.E. of Volkach.

LABAAR, a town of Hindoostan, in the subah of Agra; 75 miles S.S.E. of Agra.

LABACCAN, a northern province of Celebes, which, together with Bougero and Sageree, are the plains lying between Tello and Tanete, the proper granaries of Celebes.

Labaccan has one native regent, who has the appellation of “Crain.”

LABADDA, a town and district of Africa, on the Gold Coast.

LABADIE, JOHN, in *Biography*, a celebrated enthusiast, was born at Bourg, in Guenac, in the year 1610; when he was six years old he was sent to Bourdeaux to be instructed in the Jesuits' school, and was at an early age admitted into the order, of which he continued a member fifteen years: He was so highly esteemed for piety and learning, that it was with the utmost difficulty he obtained his dismissal when he asked for it. At length he quitted the society and became an itinerant preacher. The austerity of his manners, his great zeal, and affected piety, procured him many admirers wherever he went. At Amiens he obtained a canonry, but being detected in some criminal intrigues, the bishop ordered him to be arrested; he, however, escaped, and concealed himself at Paris. On this and some other parts of Labadie's conduct, Bayle makes the following remarks, which, in some degree, are probably applicable to religious enthusiasts of other countries besides France: “I do not,” says the biographer, “warrant the certainty of all these facts, but I affirm that it is very probable, that some of those spiritual devotees, who make people believe that a strong meditation will ravish the soul, and hinder it from perceiving the actions of the body, have a mind to toy with their devout sisters with impunity, and to do still worse. In general, there is nothing more dangerous to the mind than too mystical and too abstracted devotions; and, doubtless, the body in that case runs some hazard, and many are glad to be deceived.” Labadie became a director of a convent of nuns, among whom he introduced a new rule, and the notions of the Quietists, with additions of his own, *viz.* that the scriptures were not necessary to salvation; that outward worship is of no avail: that all prayer ought to be mental; and that there are two churches, that of Christians in degeneracy, and the other regenerate. About the year 1650, Labadie renounced the Romish religion at Montauban, at the same time declaring he had contemplated this measure more than fifteen years. His conversion excited much conversation and many discussions among the Catholics; several attempts were made to engage him to return to the bosom of the true church, but without producing any effect on his mind. His licentious practices were now exposed, and probably very much exaggerated: the Protestants, proud of so important a convert to their cause, would listen to none of the accusations, and he was chosen pastor of the reformed church at Montauban in the year 1651. Here he exercised the duties of the ministerial office for eight years, and then, on account of some disputes on subjects which he was unable to justify, he went to Geneva. Here his devout manners and popular preaching gained him a vast multitude of adherents, but by others every means was taken to drive him from the town, and in 1666, these people accomplished their purpose, by procuring an invitation to be sent to him from the Walloon church at Middleburgh, the capital of Zealand, which he readily accepted. He made many converts in this place, among whom was the celebrated Anna Maria Schurman, of Utrecht, whose great learning rendered her so famous in the republic of letters during the seventeenth century. Labadie sent disciples to propagate his doctrines, and to gather contributions in different parts of Holland, on which account he was obliged to withdraw to Erfurt, the capital of Thuringia, and from thence to Altona, where he died at the age of sixty-four, in the year 1674. After his death, the community settled at Wiewert, in North Holland, where it

found a peaceful retreat, and soon fell into oblivion. Labadie was author of many works which are full of mysticism; but they carry evident marks of a lively and glowing imagination. Bayle. Meisern.

**LABADISTS, or LABBADISTS, in Ecclesiastical History,** a sect of religionists, followers of the opinion of Jean de Labadie, who lived in the 17th century, and was contemporary with Mademoiselle Bourignon.

Some of his tenets were, that, 1. God could and did deceive men. 2. That in reading the scriptures, greater attention should be given to the internal inspiration of the Holy Spirit, than to the words of the text; that the scripture was not sufficient to lead men to salvation, without certain illuminations and revelations from the Holy Ghost; and that the efficacy of the word depended upon him that preached it. 3. That baptism ought to be deferred till mature age. 4. That the good and the wicked entered equally into the old alliance, providing they descended from Abraham, but that the new admitted only spiritual men. 5. That the observance of Sunday was a matter of indifference. 6. That Christ would come and reign a thousand years on earth. 7. That the eucharist was only a commemoration of the death of Christ; and that though the symbols were nothing in themselves, yet that Christ was spiritually received by those who partook of them in a due manner. 8. That a contemplative life was a state of grace, and of divine union during this life, the summit of perfection, &c. 9. That the man whose heart was perfectly content and calm, half enjoys God, has familiar entertainments with him, and sees all things in him. 10. That this estate was to be come at by an entire self-abnegation, by the mortification of the senses and their objects, and by the exercise of mental prayer. He also maintained, that the faithful ought to have all things in common, and that there is no subordination or distinction of rank in the church of Christ. It is said that the Brownists, and afterwards the Quakers, offered to connect themselves with this sectary, but were rejected. See Journ. des Scavans for October, 1727, where we have some account of Labadie and his followers, which were mostly women; and with some of whom, it has been said, he took criminal liberties.

**LABAREES, in Geography,** a town of Spain, in the province of Asturia; 12 miles W. of Santillana.

**LABARIFERI, among the Romans,** standard bearers, who carried the labarum.

**LABARIUM, a looseness of the teeth.**

**LABARUM, in Antiquity,** the banner or standard borne before the Roman emperors in the wars.

The labarum consisted of a long lance, or pike, with a staff at the top, crossing it at right angles; from which hung a rich streamer, of a purple colour, adorned with precious stones, and curiously inwrought with the images of the reigning monarch and his children.

Till the time of Constantine, this standard had an eagle painted upon it; but that emperor introduced in lieu of it a cross. Accordingly, the summit of the pike supported a crown of gold, which inclosed the mysterious monogram, at once expressive of the figure of the cross, and the initial letters of the name of Christ, as represented under the article Cross. The safety of the labarum was entrusted to 50 guards, of approved valour and fidelity; their station was marked by honours and emoluments; and some fortunate accidents soon introduced an opinion, that as long as the guards of the labarum were engaged in the execution of their office, they were secure and invulnerable, amidst the darts of the enemy. This standard the Romans took from

the Germans, Dacæ, Sarmatæ, Pannonians, &c. whom they had overcome.

The name labarum was not known before the time of Constantine; but the standard itself, in the form we have described it, abating the symbols of Christianity, was used by all the preceding emperors.

In the second civil war Licinius felt and dreaded the power of this consecrated banner, the sight of which, in the distress of battle, animated the soldiers of Constantine with an invincible enthusiasm, and scattered terror and dismay through the ranks of the adverse legions. Eusebius (in Vit. Constantin. l. ii. c. 7, 8, 9.) introduces the labarum before the Helvic expedition; but his narrative seems to indicate that it was never shewn at the head of an army, till Constantine, above 10 years afterwards, declared himself the enemy of Licinius, and the deliverer of the church. The Christian emperors, who respected the example of Constantine, displayed in all their military expeditions the standard of the cross; but when the degenerate successors of Theodosius had ceased to appear in person at the head of the armies, the labarum was deposited as a venerable, but useless, relic in the palace of Constantinople. Its honours are still preserved on the medals of the Flavian family. Their grateful devotion has placed the monogram of Christ in the midst of the ensigns of Rome. The solemn epithets of, safety of the republic, glory of the army, restoration of public happiness, are equally applied to the religious and military trophies; and there is still extant a medal of the emperor Constantine, where the standard of the labarum is accompanied with these memorable words, "BY THIS SIGN THOU SHALT CONQUER."

The derivation and meaning of the word *labarum*, or *labarum*, which is employed by Gregory Nazianzen, Ambrose, Prudentius, &c. still remain totally unknown; in spite of the efforts of the critics, who have ineffectually tortured the Latin, Greek, Spanish, Celtic, Teutonic, Illyric, Armenia, &c. in search of an etymology.

Some derive the word from *labor*, as if this finished their labours; some from *λαβειν*, reverence, piety; others from *λαβειναι*, to take; and others from *λαβειναι*, spoils. The labarum has afforded very ample matter for criticism, and has been discoursed of by Fuller, Alcinius, Cujas, Gyraldus, Lipsius, Meursius, Vossius, Hoffman, Valois, Du-Cange, &c.

**LABAT, JOHN BAPTIST, in Biography,** was born at Paris in 1663; at the age of twenty he entered into the Dominican order, and made his profession in 1685. Having completed his studies he became professor of philosophy at Nantz, after which he was, in 1693, sent by his superiors to America as a missionary. He returned to Europe in 1705, and being landed at Cadix, he travelled through Spain and Italy, where he resided some years. During this period he employed himself in drawing up a narrative of his observations, which he published at Paris, in 1722, with the title "Nouveau Voyage aux Isles de l'Amérique, &c." in six volumes. A second edition was given to the world in eight volumes, in the year 1741. He was author likewise of "Travels in Spain and Italy;" in eight volumes; and he edited the following, viz. "New Relation of Western Africa," 5 vols.: "Voyages of the Chevalier Merchaux to Guinea;" "Historical Relation of Western Ethiopia;" and "Memoirs of Chevalier d'Arvieux," in 6 vols. Labat died at Paris in 1738. Moreri.

**LABATA, in Geography,** a town of Spain, in Aragon; 10 miles E. of Huelca.

**LABATIA, in Botany,** named by professor Swartz, in memory of John Baptist Labat, a Dominican monk, who, between

between the years 1700 and 1713, investigated the plants of Africa and the West Indies, of which he drew up numerous descriptions, collecting every thing memorable respecting their economical uses, and their modes of cultivation and preparation. Haller speaks of him as a shrewd man of business, rather than an able naturalist.—Swartz. Prodr. 32. Fl. Ind. Occ. v. 1. 263. Schreb. 790. Willd. Sp. Pl. v. 1. 623. (*Chaetocarpus*; Schreb. 75. *Pouteria*: Aubl. Guian. v. 1. 85. Juss. 176. Lamarck (Illustr. 1. 72).—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Bicornis*, Linn. *Guianacae*, Juss.

Gen. Ch. Calyx inferior, permanent, of four leaves; the two opposite ones erect; two smaller ovate, obtuse, concave, internal. Cor. of one petal; tube somewhat bell-shaped, shorter than the calyx; limb in four minute, erect, bluntish, equal segments, with two opposite, smaller, intermediate, lanceolate ones. Stam. Filaments four, the length of the corolla, erect, awl-shaped, close to the pistil; anthers erect, pointed. Pist. Germen superior, roundish, minute; style awl-shaped, equal to the stamens; stigma simple, obtuse. Peric. Capsule large, roundish, rough, of four cells and four valves. Seeds solitary, oblong, compressed.

Eff. Ch. Calyx inferior, of four leaves. Corolla somewhat bell-shaped, four-cleft, with two smaller intermediate segments. Capsule of four cells. Seeds solitary.

1. *L. sessiliflora*. Sw. Fl. Ind. Occ. t. 6.—Flowers sessile. Leaves silky.—Found by Swartz in bushy parts of the mountains of Hispaniola. The stem is shrubby, six feet or more in height, erect, smooth, with a greyish rusty bark; the branches alternate, straight, bearing upright, round, rusty smaller branches. Leaves alternate, stalked, oblong-lanceolate, pointed, entire, wavy, rigid, two or three inches long, elegantly ribbed and veined beneath; the young ones shining and silky, with a golden rusty hue; the older more silvery. Footstalks short, round, rusty. Flowers axillary, sessile, mostly solitary, whitish, very small. Fruit the size of a nutmeg, roundish, rough and rusty, the internal partitions yellow. Sometimes there are but two cells and as many seeds, the fruits of this natural order being liable to vary greatly in the number of their divisions. The flowers appear in May and June; the fruit ripens in December and January.

2. *L. pedunculata*. With. n. 2. (*Pouteria guianensis*; Aubl. Guian. t. 33.)—Flowers stalked. Leaves smooth.—Native of woods in Guiana, where it is called by the Indians *Pourouma-Pouteri*. Aublet found it bearing both flowers and fruit in November. The trunk, according to this writer, is 40 feet high, and a yard in diameter, with a rough reddish bark, and hard, close-grained, white wood; the branches long and subdivided, leafy at their extremities. Leaves obovate, pointed, entire, smooth, three or four inches long, on foot-stalks nearly half that length. Flowers small, greenish, on short simple axillary stalks, two or three together. Fruit oval, hard, rough with rigid short hairs, red internally, as is likewise the skin of the seeds.

LA BATIE NEUVE, in *Geography*, a town of France, in the department of the Higher Alps, and chief place of a canton, in the district of Gap. The town contains 200, and the canton 3130 inhabitants, on a territory of 125 kilometres, in eight communes.

LABE, PULLIS, in *Biography*, was born at Bourges in the year 1607, and at the age of sixteen he entered the society of the Jesuits, and became distinguished as a teacher of the languages, of rhetoric, and philosophy, in the college of his native place. He was afterwards professor of moral theology at Paris, where he resided till his death, which

happened in 1667. He was reckoned a man of profound learning, and indefatigable industry. He was author of many works, of which several relate to the history of his own order; the most important is "A General Collection of Councils," with notes, in seventeen vols. fol. His grammatical work for the use of students in the languages, entitled "Erudite Pronuntiatiois Catholici Indices," has been frequently reprinted in this country. The edition by Edward Leedes is well known in our schools. Its object is to point out the quantity of Latin proper names of persons, places, &c. Moren.

LABBE, in *Ornithology*. See *LARUS parasiticus*.

LABBOCK BAY, in *Geography*, a bay on the N.E. coast of the island of Borneo. N. lat. 6 2'. E. long. 117° 55'.

LABDACISM, *Λαδδακισμος*, in *Rhetoric*, the too frequent repetition of the letter L, as *sol et luna luce luculant*, and *alra levi lactea*.

LABDANUM, in the *Materia Medica*. See *LABANUM*.

LABDARA, in *Geography*, a small island in the gulf of Venice. N. lat. 44° 14'. E. long. 15 19'.

LABEL, a long thin brass ruler, with a small sight at one end, and a centre-hole at the other; commonly used with a tangent line on the edge of a circumferentor, to take altitudes, &c.

LABEL, in *Law*, is a narrow slip of paper, or parchment, affixed to a deed or writing, in order to hold the appending seal. Any paper annexed by way of addition, or explanation, to any will or testament, is also called a label, or codicil.

Among apothecaries likewise, the slip of paper round their phials, containing directions how to use the medicine, is called a label.

LABEL, in *Heraldry*, a kind of addition to the arms of the heir or first son, to distinguish him from the others. See *FILE*.

Although the file or label be used as a distinction of houses, it is nevertheless properly placed by Holme, as an ordinary, because it is variously borne and charged.

The label is esteemed the most honourable of all differences; and is formed by a fillet usually placed in the middle, and along the chief of the coat, without touching its extremities. Its breadth ought to be a ninth part of the chief.

It is adorned with pendants somewhat like the drops under the triglyphs in the Doric frieze. When there are above three pendants, the number must be specified in blazoning. There are sometimes six.

The label, variously charged, is the difference generally affixed on the coats of arms belonging to any of the royal family; when his majesty shall think fit so command that arms be granted them.

LABELLA LEPORINA, in *Surgery*. See *HARE-LIP*.

LABELLED LINE, in *Heraldry*, a term used by some to express the line in certain old arms, called more usually *urdee* or *champagne*. Others apply the same word to express the patee or dove-tail line, called also the *inclave line* by Morgan. It somewhat resembles the joint called a *dovetail* by our joiners, and its points, as they proceed from the ordinary, whether chief or fess, resemble the ends of labels. See *URDÉE* and *PATEE*.

LABEO, C. ANTISTIUS, in *Biography*, an eminent Roman lawyer, the son of one of the persons who conspired against the life of Julius Cæsar, was a disciple of Trebatius, and lived under Augustus. He became a very learned man, preserved a free and independent spirit under the rule of a despot, and shewed on various occasions that he had not for-

gotten,

gotten, nor was careless of the liberties of his country. His great rival in jurisprudence was Ateius Capito, and Tacitus, speaking of these two rivals, calls them "the two ornaments of peace in their age;" he however celebrates the incorrupt freedom of the latter, which was the cause of his rising no higher than the prætorship; while the obsequiousness of the former was rewarded with a consulate. Labeo divided his time between business and study, spending six months at Rome, in giving advice and attending to public duties, and living the other six in a country retreat. He wrote a number of books chiefly relating to jurisprudence. Aulus Gellius refers frequently to the commentaries of Labeo, on the twelve tables. Suetonius, Lempriere.

LABEO, in *Ichthyology*, a name given by the old Latin writers to the fish usually called *cheilon* and *cheilon*. See *CYPRINUS Labeo*.

LABER, in *Geography*, a town of Bavaria, in the principality of Newburg; nine miles W.N.W. of Ratibon.

LABERIUS, DECIMUS, in *Biography*, a writer of dramatic pieces, similar in some respects to our pantomimes, was a knight by birth. He was sixty years of age when Julius Cæsar, in the plenitude of his power, urged him, by the promise of a liberal reward, to appear on the stage, in one of his own pieces. The poet consented with great reluctance, and shewed his resentment during the acting of the piece, by throwing severe aspersions upon Julius Cæsar, and by broadly hinting at the tyranny and despotism of which he was guilty. In pronouncing the following line, he fixed the eyes of the whole assembly upon the usurper:

"Necesse est multos timeat quem multi timent."

"Many he dreads in turn, whom many dread."

Cæsar restored him to the rank of knight, which he had lost by appearing on the stage, but he could not so easily restore him to the good opinion of his friends. When he went to take his seat among the knights, no one offered to make him room, even his friend Cicero sarcastically said "Recipissem te nisi angustè fedem;" *I would make you room if I were not so much crowded:* to which Laberius replied, "Mirum si angustè fedes, qui soles duabus sellis federe;" *I wonder you should be crowded, who usually sit upon two seats at once;* alluding to the orator's meanness and duplicity, during the civil wars between Cæsar and Pompey. Laberius died in the year 44, B.C. Some fragments of his poetry remain, and are given in Mattaire's *Corpus Poetarum*: the titles of his several pieces are preserved in Aulus Gellius. Horace alludes, but without any respect to the names of Laberius, this was, probably, rather in contempt of the species poetry, than the author.

LABES, in *Geography*, a town of Hinder Pomerania; 30 miles S. of Colberg. N. lat. 53° 39'. E. long. 15° 39'.

LABEZ, a province, sometimes called a kingdom, of Algiers, S. of Boujeh.

LABIA, or LIPS, in *Anatomy*. See *DEGLUTITION*.

LABIAL, a term in the French law, used in the same sense with oral.

LABIAL Letters, among *Grammarians*, are those whose pronunciation is chiefly effected by the motion of the lips. By which they stand contradistinguished from palatal, dental, guttural, &c. letters.

LABIAL Offers are such as are only made by word of mouth, or even by writing, where there is no valuable consideration. In courts of equity these are not regarded.

LABIALIS, in *Anatomy*, an epithet given to certain parts belonging to the lips, as the arteries, veins, glands, &c.

LABIATÆ, in *Botany*, a natural order of plants, fo-

called, after Tournefort, from *labium*, a lip, in allusion to the shape of the corolla, which resembles the mouth and lips of an animal. This order, the 39th of Jusseu's system, and the sixth of his eighth class, is equivalent to Linnæus's 42d natural order, *Vericillatæ*; or to the *Didynamia Gymnospermia* of his artificial system; except that the latter necessarily excludes such genera of *labiate* as have but two stamens, and which are therefore referred to his second class, *Diandria*.

The characters of Jusseu's eighth class are—"Cotyledons two. Corolla of one petal, inferior." (See *GENTIANÆ*.) He defines the order in question thus.

*Calyx* tubular, either equally five-cleft, or two-lipped. *Corolla* tubular, irregular, generally two-lipped. *Stamens* four, two longer and two shorter, situated under the upper lip of the corolla; in some cases only two, the others being abortive. *Germen* four-lobed; style solitary, springing out of the receptacle, between the lobes of the germen; stigma cloven. *Seeds* four, naked, erect, affixed to the receptacle by their base, and concealed in the permanent calyx. *Embryo* destitute of albumen. *Stem* quadrangular, oppositely branched, for the most part herbaceous, but sometimes shrubby. *Leaves* opposite. *Flowers* opposite, often bracteated, or attended by bristles, solitary or whorled, corymbose or spiked, terminal or axillary.

The sections are four.

1. Stamens two fertile, two abortive. This contains *Lycopus*, *Anethus*, *Cunila*, *Ziziphora*, *Monarda*, *Rosmarinus*, *Salvia* and *Collinsonia*, to which are added by Mr. Brown (Prodr. v. t. 501.) *Wstringia*, Smith's Tracts, 277. t. 3, *Microcoris*, *Hemigenia* and *Hemiandra* of Brown; see the two latter articles in their places.

2. Stamens four, all fertile. Upper lip of the corolla wanting, or nearly so.—*Argemone* of Linnæus, (which Jusseu chooses to call *Bugula* after Tournefort), and *Teucrium*, with *Anisomelis* a new genus of Mr. Brown's.

3. Stamens four, all fertile. Corolla with two lips. Calyx five-cleft.—*Satureia*, *Thysanopus*, *Nepeta*, *Perilla*, *Hyssopus*, *Lavandula*, *Sideritis*, *Mentha*, *Glechoma*, *Lamium*, *Galopissis*, *Betonica*, *Stachys*, *Ballota*, *Marrubium*, *Leonurus*, *Plonius* and *Moluccella*, to which are to be added *Elytholzia* (see that article), and *Leucas* of Burmann and Brown.

4. Stamens four, all fertile. Corolla with two lips. Calyx two-lipped.—*Clinopodium*, *Origanum*, *Thymus*, *Thymbra*, *Melissa*, *Dracocephalum*, *Horminum* (now reduced to *Melissa*), *Melilotus*, *Plectranthus* (which is *Germana* of Lamarck and Jusseu), *Ocymum*, *Trichostema*, *Prunella*, *Scutellaria*, *Prasium* and *Phryma*, with *Cibolida* and *Cryphia* of Brown, and *Prasanthera* of La Billardiere.

The plants of this natural order are, for the most part, agreeably aromatic, or bitter, none of them poisonous. The root is generally perennial. Flowers of various colours, seldom fragrant in themselves, except as they partake of the aromatic quality of the herbage. The stamens and stigma are, as Linnæus observes, so well sheltered, in most instances, from the rain, while the air has free access at the sides, that impregnation rarely fails. *Mentha*, however, forms an exception, the stamens being prominent, and the corolla open; and as its seeds are scarcely ever prolific, no plant has a more ample increase by the roots.

LABIAU, in *Geography*, a town of Prussia, in the province of Samland, with an ancient castle, on the Deim; 20 miles E.N.E. of Königsberg. N. lat. 54° 10'. E. long. 21° 15'.

LABIEZ, a town of the duchy of Warsaw; 32 miles N. of Gnesna.

LABINÆ, in *Natural History*, a term used by the authors who have written of Switzerland, and other mountainous

tainous countries, to express those vast masses of snow, which sometimes fall from the hills and bury houses, or even whole towns; and when hardened by the frosts, as is often the case, into solid substances, they overthrow woods, villages, and whatever stands in the way of their course, as they roll down the steep sides of the precipices in their way. Some authors have also extended the word to a larger sense, and made it express the falling of vall rocks, or parts of mountains, and their rolling down in the same manner into the flat country: this is a mischief very frequent in the same places, after frosts, and often very fatal. See GLACIERS.

**LABIUM**, in *Anatomy*, a term given to various parts in the body, which, from their prominent figure, admit of being compared to the lips. Thus the labia pudendi are the two folds of skin which bound the external female organs of generation laterally. (See GENERATION.) The edges of the crilla of the os innominatum are called its labia.

**LABIUM Leporinum**, in *Surgery*. See HARE-LIP.

**LABON**, in *Geography*, a town on the W. coast of the island of Sumatra, which chiefly trades in pepper. N. lat.  $3^{\circ} 20'$ .

**LABOMAS**, a town of the island of Cuba; seven miles S. E. of Spiritu Santo.

**LABON**, a town on the W. coast of Sumatra, celebrated for gold dust and camphire; but the inhabitants are referred in their traffic with strangers: 150 miles S. E. of Acheen. N. lat.  $3^{\circ} 10'$ . E. long.  $96^{\circ} 40'$ .

**LABOON**, a district of Sumatra, on the banks of the river CATTOW, bounding the country of the Rejangs on the N. or inland side.—Also, a town on the E. coast of the island of Borneo, seated on a peninsula that projects into the sea. N. lat.  $5^{\circ} 9'$ . E. long.  $119^{\circ} 5'$ .

**LABOR**, a town of New Navarre; 280 miles S. E. of Casa Grande.

**LABORATORY** is a place furnished with chemical apparatus, and entirely devoted to the different operations of chemistry, whether on the scale of chemical manufacture, or for the purpose of experimental research. In the present article, however, we shall confine ourselves to the latter, since it is more proper to describe the apparatus used in the large way under the manufacture of the respective articles. Although many of the most distinguished labourers in chemical science have been content with such apparatus as they have made themselves, or converted from the common domestic utensils; it must, nevertheless, be obvious, that they would have succeeded better with well contrived and appropriate apparatus, and their researches would, in all probability, have been much more extended.

Every chemical experimenter will find a considerable advantage in so much mechanical talent, as will enable him to make, or repair at least, the most common of his apparatus. For this purpose he should possess a set of mechanical tools, such as a lathe and vice, with files and rasps for metal and wood. The tools for making ferrets, as well in the lathe as by the *ferret-plate* and *taps*, will also be necessary. To these should be added a small forge, anvil, and hammer, for the purpose of forging small articles. A set of brazier's and tinman's tools will be found very useful, and a little experience will enable the operator to make any article of tin or copper, which is not very complicated. In addition to the above, the glass-blower's lamp and bellows will be of essential service for sealing and bending glass tubes, and other purposes.

Some of these may appear unnecessary, especially in large towns, where the different artists may be found, but it will be strongly in the recollection of all who have had occasion to get apparatus made, that they can seldom get them constructed to

their wish, although they stand by the art. The want of proper tools, and a little mechanical dexterity, have frequently prevented or put an end to experimental investigations of considerable importance. Independent of the apartment containing the mechanical apparatus, the chemist will require at least one distinct room for a laboratory. Two rooms, however, should be employed when it is convenient. The principal room of the laboratory should be on a ground floor, for several reasons. A furnace for great heat should be in a low room, in order to have the greatest length of chimney. The ash-pit of this furnace should terminate in a cellar under the laboratory, in order that the air may enter perpendicularly, and of the lowest possible temperature. See FURNACE.

That side of the laboratory allotted for furnaces should have an arch projecting into the room about three or four feet, and of such height that a person may freely walk under it. In the highest part of this arched portion must be an opening into a chimney distinct from the rest, and built up in the same stack.

It will be found more convenient to use portable furnaces for most purposes, having none fixed but for producing very great heats, upon a larger scale, and what are generally denominated melting furnaces.

The iron chimney of the portable air-furnace may be carried to any height, and placed under or within the chimney, used for the escape of smoke and vapours.

A chimney with a funnel may, in the same way, be placed over the mouth of the portable blast furnace, invented by Mr. Aikin. This furnace may be so contrived that when the body of it is removed, the bafe may form a forge hearth, which will be found very useful. For the varieties of furnaces used in the laboratory, see FURNACE.

On another side of the laboratory must be placed a stone trough or sink, joined to a tub or cistern of water, which can be filled and emptied at pleasure, by means of a stop-cock over it, and a plug in the bottom. Over the sink-stone should be suspended a rack for holding bottles and glasses to drain after washing. On the same side may be placed a large block of wood or stone, for the purpose of holding a mortar or anvil occasionally.

A third side of this room must be occupied by cupboards and shelves, for holding the different apparatus of glass and earthen ware, and for the different substances hereafter to be mentioned.

The fourth side, which should be the lightest, must be provided with a table the whole length of this side, in the front of which, down to the floor, should be a number of drawers for holding all the dry substances. This table is for making the experiments upon, and for holding the apparatus in use at any time.

If possible, every laboratory should be joined to a second room, however small it may be, in which to perform the very nice and delicate experiments, and for keeping a few books, and choice instruments of metal, such as balances, &c.. This room should be kept very clean and dry, and as free as possible from steam and the fumes of acids.

If any part of the furniture require to be painted, the paint should be made with sulphat of lead, since it is not acted upon by acids. This substance has been used by Dr. Henry not only for this purpose but for repairing broken glass and labelling bottles. The following are the most particular apparatus with which a laboratory should be furnished.

*Mortars*.—These are of various kinds, cast-iron, bronze, steel, and Wedgwood ware. The cast-iron mortar is generally used for vegetable substances, and such as are not liable to grind off the iron. The hardness of this instrument is

much increased by casting the interior surface upon a metal mould, of the greater weight the better.

The hardness of the bronze mortar, which is generally used for the same purposes, may be increased by the same means.

The steel mortar is used for reducing very hard minerals into small bits, fitted for grinding in the mortar of agate. It consists of a cylinder of hardened steel, with a flat bottom, and a pestle of the same made to fit the mortar, accurately, from top to bottom. It is used by putting the pieces of the mineral into it, and striking the pestle with a hammer. By this means it can be reduced into tolerably small particles, without grinding off any portion of the mortar.

Hardened steel mortars of the common shape would be of great use, but it would be difficult to harden so large a mass without cracking. It might perhaps be made by welding a plate of cast steel upon a thick piece of iron, and afterwards working it into the required shape, and polishing it in the inside. If the substance is not very particular, it may be ground in a mortar of Wedgwood ware. If, on the contrary, it be very hard, the matter from the mortar will be liable to be mixed with the powder. In this case the agate mortar is much to be preferred; some stones are, however, so hard as to act upon the agate. In this instance, the matter to be ground should be weighed before and after grinding, and the increase of weight may be safely deemed loss, and allowed for in the analysis accordingly.

**Balance.**—This instrument is of great importance to the analytical chemist, and ought to weigh 100 grains to the  $\frac{1}{4}$  th of a grain. A very masterly account of the principles and construction of the balance will be found under the article BALANCE.

It will be almost unnecessary to observe, that so delicate an instrument should be kept in a separate apartment from the laboratory where fumes of acids do not prevail. It should be closely shut up in a glass case having a sliding door in the front. The strings to which the scales are suspended, should be of fine gold or silver cord, and the scales of silver or platina, and very thin. One of the scales should be provided with a loose pan of very thin platina, and balanced with the other, for the purpose of holding the substance to be weighed. The weights for chemical substances should be reckoned in, and marked with grains and decimals of grains.

**Lamp.**—This valuable instrument is a very great improvement upon the sand-bath. Its heat is regular, and may, by means of the concentric wick, be made of sufficient intensity for most purposes. Its greatest advantage, however, consists in the facility with which it can be applied or withdrawn without loss of time. See LAMP.

For nice and delicate purposes, where the heat of the lamp is required, alcohol, instead of oil, gives an intense and steady heat, and is not very expensive when a proper vessel is used for burning it. The latter kind of lamp is particularly adapted for a public lecture.

**Fig. 1. Plate XVI. *Chemistry*,** is a stand supporting the lamp, and at the same time the substance to be heated, and the connecting apparatus A B is a frame of wood. F a pillar of wood or iron, smooth and cylindrical throughout, so as to admit of the sliding rings, such as *g*, to move freely without shaking. C is the Argand lamp, having a chimney at *o* of iron. This chimney consists of two concentric tubes, connected together by small wedges of baked clay, or some other incombustible substance which is a bad conductor of heat. This contrivance not only economizes the heat, but keeps the outer tube so cool, that it may be taken hold of with the fingers. In this lamp the wick is raised by the screw,

instead of the rack, which is performed by turning the chimney round.

The funnel-shaped ring D is an improvement upon the common ring used for supporting the retort. It consists of a number of conical hoops, one fitting upon the other, so as to hold different sized retorts. The smallest hoop is about two inches in diameter, and the largest, which is attached to the sliding part, about five inches. The conical surface directs the heat to the retort, which on the common plan only serves to annoy the fingers and face of the operator, and at the same time heats the neck of the retort, where the condensation of the vapour should take place: *f* is a retort supported by the ring; *g* is a slider, having two prongs at *p* to keep the retort from falling sideways: E is a receiver to receive the contents of the retort, which may be either used alone, or with Woulfe's bottles *a, b, c*, hereafter to be described. G is a stand, with three inclined prongs of wood to support receivers of different sizes, and which may be placed at different elevations by means of the screw *n*.

**Retort.**—**Fig. 2.** This is a chemical utensil of very ancient origin, and is the most simple apparatus for distillation. Retorts are of glass, earthen-ware, and metal. Those of glass are sometimes of green glass, particularly when such heat is employed in the naked fire, as might soften the more fusible white glass. Those of flint-glass should be as thin as possible, in order to avoid breaking by an unequal expansion. When the retort is provided with a glass stopper, as at *a*, it is said to be tubulated.

This appendage is necessary only, when some fluid, such as an acid, has frequently to be added, or when it would be difficult to get the materials into the mouth of the retort. In order to add any fluid from time to time while the process is going on, the vessel (*fig. 3*) called an *acid holder* is made to fit in the place of the stopper of the retort, the part *d* being ground to fit the same. The acid is put into this vessel, and let into the retort, by a little at once, through the glass stop-cock *c*.

When the retort is used for purposes of distillation, the neck is fitted or luted into the neck of the receiver (*fig. 4*) This receiver is used for the distillation of liquids, the vapours of which are easily condensable, such as water or alcohol. When the vapours, coming over, are accompanied with elastic fluids, which are incondensable, the receiver (*fig. 5*) is better adapted. If the elastic fluid be of no importance, and inoffensive, it may escape at the conical stopper of the latter vessel every time the pressure is sufficient to raise it. It is, however, sometimes necessary to collect the gaseous fluid. In this case the bended tube (*fig. 6*) is put into the place of the stopper (*fig. 5*), the other end terminating in a pneumatic apparatus where the gas is collected. In the distillation of very volatile liquids, such as ether, it is sometimes necessary to remove the receiver to a distance from the retort, by placing between them an intermediate vessel, (*fig. 7*) called an *adopter*. The receiver (*fig. 8*) is employed for collecting the product of different degrees of strength by the application of the bottle *b*.

In the distillation of substances, which require a greater heat than glass will bear, earthen retorts are employed. They are of the same shape with those already described, and should be made of the materials with which crucibles are made. This sort of retort is generally used for the distillation of phosphorus. If its texture be not close, the phosphorus will escape in vapours through the pores. This, however, may be prevented by covering the surface with some glazing material. Iron retorts, from their great firmness, are well adapted for distilling such substances as will have no

chemical action upon them. Hence they are unfit for distilling sulphur, phosphorus, and acids, but are extremely proper for ammonia, mercury, and pitcoal. A retort of lead is used for the distillation of fluoric acid, owing to that acid combining with the flux of glass.

*Woulfe's Apparatus.*—In the distillation of substances which are merely to be raised into vapour by heat and condensed by cold, the retort, or still, with the receiver and the proper means of producing cold, are the only apparatus necessary. There is another distinct branch of distillation, in which the product is a gas, which is incondensable at the common temperature, and requires to be absorbed by water, or by some other substance dissolved in that liquid. In these processes, therefore, the temperature and size of the receiving vessels are not of so much importance as the exposure of the gaseous product to the greatest possible quantity of the absorbing liquid. Before the discovery of this most useful apparatus by Mr. Woulfe, from whom it takes its name, the common retort and receiver were used for all purposes. The elastic fluids were in consequence either compressed, and the operator was constantly in danger of being injured by the bursting of vessels, or, to remedy that evil, they were suffered to escape, and he was perpetually annoyed by the suffocating fumes which were set at liberty.

In *fig. 1.* the retort contains the materials for furnishing the elastic fluid to be absorbed by some liquid contained in the receiver E, and the succeeding bottles *a*, *b*, *c*, with their connecting tubes *r*, *h*, *t*: *v* constitutes the *Woulfe's apparatus*. A certain portion of the gas is taken up by the liquid in the receiver E. The excess passes through the tube *r* to the bottom of the liquid into the second receiver, by which another portion of the gas is absorbed. The residual gas passes along the tube *h* to the third receiver, which gives the gas a third chance of absorption. In this way it may be made to pass through any number of bottles, according to the greater or lesser facility with which the gas is absorbed. The last tube *v*, which is provided with a column of mercury, conveys the remaining gas, which is presumed to be unabsorbable, into the atmosphere, or it may be collected by a jar in the pneumatic apparatus. When the gas ceases to be furnished from the retort, in a quantity equal to the absorption in the receiving vessels, a retrograde motion will begin to take place. Atmospheric air will enter at the tube *v*. The liquid in the last receiver will be forced by its pressure into the preceding one, and if the absorption were to become complete, the whole of the liquid would be carried into the first receiver, and from thence to the retort. This evil has been very completely removed by what is called a tube of safety *f*, *l*, *x*.

*Fig. 1.*—The bulb *l* contains as much mercury as will be contained from *q* to *x*, so that when the gas, from defective absorption, accumulates in E, till its force is equal to the pressure of such a column, the excess of gas will bubble through the mercury into the atmosphere. On the contrary, when the absorption of the gas exceeds its evolution, the pressure of the atmosphere, to restore the equilibrium, will cause the mercury to occupy the ball *l*, and common air will bubble through it into the vessel E. Although this ingenious contrivance completely prevents any evil arising from the inequality of internal pressure, it is very objectionable, owing to its delicate structure, on which account it is constantly liable to be broken.

We are indebted to Mr. Knight for a great improvement on the tube of safety. This consists in having a valve of glass, similar to that of the *Nooth's apparatus* (described below), placed between the first and second vessel, so that the liquid in the succeeding bottle can never have a retrograde motion. To this valve there is no other objection than the

difficulty of getting it made in places distant from the metropolis, and its liability to be split, especially in making crystalline salts, such as the oxymuriat or carbonat of potash.

The same objection which we have made to the tube of safety, we are sorry to say applies to the whole of the *Woulfe's apparatus*. The connecting tubes are with very great difficulty ground into bottles, which makes the apparatus very expensive, and then are so liable to be broken, as to render it frequently useless.

We have before hinted, that the essential part of such an apparatus, is to expose the greatest possible quantity of the gas and the liquid to each other in a given time. In the *Woulfe's bottles*, this advantage does not obtain in so great a degree as might be effected in a simpler apparatus. We shall here subjoin a description of an apparatus of this kind, answering all the purposes to which the *Nooth's* and *Woulfe's* apparatus are separately applied. Although it has not been before made known, it has been used with great success by the writer of this article, and will no doubt be found an acquisition to the experimental as well as the manufacturing chemist.

*Fig. 9. Plate XVII. Chemistry,* is a representation of the apparatus for the absorption of gases. A is a retort from whence the gas is furnished, connected with the first bottle B, which contains the liquid to be impregnated, and into which the tube *a* is ground, reaching near to the bottom, so that when the gas enters this vessel, the liquid will be raised into the bottle C; at the same time the tube will be constantly filled, with the exception of the space occupied by bubbles of gas passing through it. If the gas is not all absorbed during its passage through this tube, the excess will pass down the tube *b* into the bottle D, which also contains the absorbent liquid. The same takes place in this bottle which is observed in that of B. The liquid ascends into the bottle E, the gas following it as before. The residual gas, should there be any, may either be conveyed into another bottle fitted like D, or may be collected in a pneumatic trough, or escape through the tube of safety *c*.

This apparatus was invented for the purpose of making the oxymuriats of the earths, for which it is admirably adapted. The earths which are mixed with the water being constantly at the bottom, if not kept in agitation, the absorption is very slow and imperfect. In this apparatus no agitation is necessary. The earth, which is at the bottom of the vessels B and D, is first raised into the tubes *a* and *c*, and becomes as much exposed to the gas as any part of the liquid medium. The tubes *a* and *c* are each about two feet long, but they do not require to be so long for most experiments of this kind. Their diameter is about  $\frac{1}{2}$  inch, so that in the course of about one minute, no less than about nine ounces are brought in contact with the gas, independent of the circular surfaces in the bottles.

In the common sized *Woulfe's bottles*, the tubes through which the gas enters seldom dip more than three inches into the fluid, so that we may safely rate the apparatus proposed as equal to at least eight of *Woulfe's bottles*. These bottles are the same with those of *Woulfe's*; the tubes are much simpler, and being stronger are less liable to break. Another great advantage is that of its not requiring a tube of safety. The great facility with which it can be applied to all the purposes of the *Nooth's apparatus*, as well as the *Woulfe's*, and with much more effect, will be soon appreciated. Under the article *Woulfe* will be found the description of a differently constructed apparatus. See *Plate V. Chemistry*.

*Nooth's Apparatus.*—This is represented in *fig. 10. Plate XVI.* It consists of three vessels fitted together by ground

ground joinings. It differs in its use from the Woulfe's, in being fully adapted for impregnating water and other bodies, with such gases as are disengaged from their combinations without heat, such as the carbonic acid, and sulphuretted hydrogen. The lower vessel A contains the substance from which the gas is obtained, such as carbonate of lime; the sulphuric acid being introduced occasionally at *d*; the gas enters the vessel B through the glass valve *b*. This is magnified in *fig. 12*. The tubes *b* and *d* are at first in one piece and ground into the part *a e*; the portion *e* is then cut away, to make room for the hemispherical valve, the under side of which is ground flat, to fit the end of the tube *b*. The valve, on being raised by the gas, instantly falls and prevents the water from descending into the lower vessel. The air then enters the liquid in B, *fig. 10*, through small holes to disperse it as much as possible. When the gas accumulates in B, a portion of the liquid is driven up into the vessel C, the bubbles of air following it tending still more to promote the absorption. The air in C, if not absorbed, will at certain intervals raise the conical stopper *e*. This stopper should be so heavy as just to rise before the vessels would burst, and should be so conical as not to stick in the least degree. After the liquid is impregnated it is drawn off at the cock D.

*Fig. 11*, is a simpler and better apparatus for this purpose, invented by Dr. Hamilton. It is simpler, because the vessels are fewer, and the valve, which is complicated and liable to be fast, is dispensed with; and it is better because the gas comes in contact with more of the liquid in a given time, and consequently the absorption is effected sooner. The gas is furnished by the retort B, ground into the vessel A. From the latter the absorbing liquid is raised into the vessel C, till the air bubbles go through it, and if not absorbed passes out at *d*. This apparatus wants nothing more than a tube of greater length, for the gas to pass through, to make it complete.

In comparing the two last with that of *fig. 9*, the latter will be found much superior even to that of *fig. 11*.

*Gasometer and Gas Holder.*—The difference between these two vessels, consists merely in one having the means of measuring the quantity of gas which it contains at any time, and the other not, while both are employed as gas holders.

The gasometer was made a very expensive and magnificent apparatus by the celebrated Lavoisier, at the time he prosecuted his experiments upon elastic fluids. This instrument, much simplified, we shall describe in *fig. 13, Plate XVII*. A is a vessel containing water or some other liquid, which will not be acted upon by the gas to be held in it. B is a vessel inverted in the vessel A, and capable of moving up and down in it. E and F are cords by which the vessel B is suspended, the weights and pulleys being concealed in the tube C D.

*Fig. 14* is a section to shew the interior parts of this apparatus. K L is an interior vessel of the same shape, with the vessel B soldered to the bottom of the vessel A, so that no water or other liquid in A can communicate with the inside of it. This is done for the sake of using less of the liquid employed, which in the mercurial gasometer is very desirable, as well for the sake of economy, as making the apparatus more portable; *a* is a pipe passing through the middle of the vessel K L, and communicates with the tubes *o* and *d*. The air is introduced at the stop-cock *e*, and passing along the pipes *o* and *a*, raises the vessel B, which is counterpoised by the weights *r* and *q*. These weights are conducted down the middle of the tube C D, by the small pulleys *x x* and *y y*. The tube *d*, which, with that of *o*, is common to the tube *a*, is to let the air out of the gasometer at the stop-cock *f*, so that the air passes through *a*, both in its entry and its exit: *g, fig. 13*, is a flexible tube, serving to con-

duct the air to a pneumatic trough for examination, or for using the blowpipe when the vessel contains oxygen. This apparatus is provided with a graduated scale G, which tells the number of cubic inches contained in it. It is this scale which constitutes it a gasometer, without which it would be simply a gas-holder.

The mercurial gasometer is on the same plan with the above, but the materials must be unobfusible of the action of the mercury. The vessels are generally made of cast-iron. The outer and the fixed inner vessels may be cast in one piece. The moveable vessel may be of the same metal, or of glass. The pipes must be of wrought iron, and accurately ground into the cast iron. Two gasometers with water, and one with mercury, will be indispensable in experiments in gaseous chemistry.

A very ingenious apparatus, answering the common purposes of gas-holder and gasometer, and in many instances the pneumatic trough, has been invented by Mr. Pepys. It consists of a tin vessel A, *fig. 15*, and a pan or tray B connected with it by pillars. The pipe *a* opens into the middle of the tray, and proceeds in a contrary direction near to the bottom of the vessel A: *v* is another pipe which also communicates with the tray, and just enters the vessel A: *r r* is a glass tube cemented firmly into two brass sockets, which communicate with the top and bottom of the vessel A. This tube is graduated, and shews how high the water stands in the vessel, and consequently tells the quantity of air contained in it. The vessel A is first filled with water by opening the cocks *a* and *v*, and shutting that of *n*, C being closed at the same time. The tray is now filled with water, which descends through the tube *a* into A, while the air in the same escapes at the opening into the tray, from *v*. When the vessel A is full of water, the cocks *a* and *v* must be closed, and the plug may be taken out of C. If the vessel and pipes be air-tight above, no water will be discharged at C, hence this pipe is inserted at such an angle into A, that the lowest part of the outer end is higher than the highest part of the inner end. The next thing is to fill the vessel with gas, and for this purpose the neck of a retort, or other tube from which the gas is to proceed, should be introduced at *c* till it passes the inner end of the same. The gas will rise in bubbles into the upper part of the vessel, while the same quantity of water will run out at the pipe C into an open vessel placed under it. When the water ceases to run out, and air-bubbles escape at C, the tube from whence the gas was furnished may be withdrawn, and the screw-plug put in its place.

In order to transfer the gas from this vessel into a jar, the tray must be filled with water, and also the jar, which must then be placed over the aperture from *v*. On opening the stop-cock *v*, that of *a* being previously opened, the air will ascend into the jar, while the same quantity of water will descend into the vessel A, to supply its place.

This apparatus may be used for several other purposes. A bladder may be tied to the stop-cock *n*, which being opened at the same time *a* is opened, the bladder will be filled with the gas. A flexible tube may be fixed on the same stop-cock for making experiments with the blow-pipe. The gasometer, *fig. 13*, will be found better for the blow-pipe, on account of the equal pressure in the apparatus last described.

*Pneumatic Trough*—This is a simple trough or cistern made of tin or copper japanned, and is used for collecting different gases. The size is generally about 18 inches long, 12 wide, and 12 deep. *Fig. 16, Plate XVI*, represents this trough. A is a sliding shield which can be taken out. It is formed of two plates laid together; the under plate is made so concave, that when the convex side touches the upper plate in the middle, they are distant at the edges about one inch.

A rim being foldered round the two gives the shelf the appearance of a solid, concave on the under side and flat on the upper side.

Any gas coming from the retort B, passing under the shelf in any situation, must be determined to the round hole in the middle, which is about half an inch wide. The trough, when used, is filled with water about an inch above the shelf, the jar C being filled with the same, and placed over the aperture through which the bubbles ascend. The stand D, having a foot of lead or iron, will be found very useful for supporting a retort or other vessel in these experiments. When a number of vessels are occupying the shelf, and frequently some are very tall, and of small diameter, it will be found necessary to support them to prevent their being thrown over. This may be effected by having a number of supporters of different sizes, such as A. This is better represented in *fig. 17*. At *d* is a socket to fit the pins which surround the shelf; *n, c*, are springing claws to embrace the glass.

In making experiments upon gases, a number of vessels, such as *fig. 18*, will be necessary. These are generally called eudiometer tubes, some of them are graduated into cubic inches, for the purpose of measuring the volume of gas used, or resulting from any experiment. See EUDIOMETRY.

Besides the trough already described, which is used with water, it is necessary to be provided with one for mercury. Indeed the latter is absolutely indispensable when the gases, which are the subject of experiment, are absorbable by water: such as the muriatic acid gas, and ammoniacal gas.

*Fig. 19*, is a view of the mercurial trough; it is generally made of a solid block of some hard wood, or of marble; or it may be made much neater, and with less labour, of pieces of wood joined together, closely and firmly by iron screws. The first cavity, *a, e, b*, may be about eight inches long, four inches broad, and one inch in depth: the second or lower cavity, *d*, should be about  $6\frac{1}{2}$  inches long,  $1\frac{3}{4}$  wide, and the same depth: *c* is a smaller cavity, about  $\frac{3}{4}$  of an inch wide,  $1\frac{1}{2}$  long, and one inch deep. The cavity *d* is intended to receive the glass jar, *fig. 20*, for the purpose of filling it with mercury: *a, b*, are small cavities in which to introduce the fingers for the purpose of raising the jar when full of mercury. The cavity at *e* is to place the inverted jar over, for the purpose of introducing any gas into it. The side *a, c* answers as a shelf to rest the inverted jars upon: *fig. 21*, is a ring of iron, with a leg to slip into holes on the side of the trough, for the purpose of supporting the jars, which would otherwise be liable to fall on account of their small base.

*Eudiometer*.—Formerly the use of this instrument was confined to the analysis of the atmosphere. It has now, however, become of great importance in gaseous chemistry, and has been considerably improved within these few years.

In order to ascertain the nature of, and to distinguish the different gases, chemists have generally recourse to some substance capable of absorbing the gas under examination. The eudiometer is the vessel which contains, or communicates with the substance which is to absorb the gas, and the tube being graduated marks out the quantity absorbed, and shews how much of that particular gas was present.

The first instrument of this kind, adapted to general purposes, was invented by Dr. Hope, of which a description will be found under EUDIOMETRY. Under the same article will be found Mr. Davy's eudiometer for the analysis of the atmosphere.

Mr. Pepys has lately invented a very good eudiometer: it differs from Dr. Hope's in the bulb, which holds the absorbing liquid, being an elastic gum bottle instead of glass.

A glass neck is tied into the neck of the bottle, into which the graduated tube is ground. When this eudiometer is used, the elastic bottle is filled with the absorbing liquid (lime water, for instance), and the tube filled with the gas under examination (supposed to be carbonic acid), introduced into the neck.

On agitating the liquid to mix it with the gas, as the absorption goes on, the elastic bottle collapses, by the atmospheric pressure, and the liquid occupies the place of the absorbed gas in the tube.

The only objection to this eudiometer is its want of flexibility, and this varying under different circumstances, so that the density of the contained air can never be accurately known. The writer of this article has done away the above objection, by using a bag of oiled silk instead of this elastic gum bottle. The silk must be very well coated, and the coating completely dry.

The eudiometer of Volta, which is found very useful in the presence of the electric machine, is also called the *determining jar*. It is used with oxygen to detect the presence of hydrogen, and *vice versa*. This instrument, *fig. 22*, consists of a very thick glass tube A B, having two bits of metal *a, b*, passing into the tube opposite to each other, the inner ends being separated from each other a small distance, so that an electric spark passing between them, may be capable of inflaming hydrogen with oxygen.

The gas to be examined is introduced into this jar, and the electric spark passed through it. If hydrogen and oxygen be present, in sufficient quantity, they will explode, forming water, and producing a diminution of volume equal to the original bulk of gases which have entered into combination. In the explosion of these gases the water or mercury is apt to be thrown in various directions by the concussion. We are indebted to Mr. Pepys for an ingenious method of preventing this evil. The tube A B is secured to the iron stand D E by means of a socket C. D is an iron tube containing a spiral spring, similar to that of the spring *steel-yard*. The rod *d*, which acts upon the spring, is fastened to the foot E, which is so heavy as not to be raised by the force exerted upon the spring. When the detonation of the gases takes place, the force is exerted equally upon the instrument and the liquid, in which it is immersed, when they are both at liberty. Instead of being all exerted upon the latter, it causes the tube to rise, the spring in the socket D giving way; and thus prevents the liquid from being dispersed. All the gaseous bodies containing hydrogen can now be analysed by this instrument. Dr. Henry has discovered that ammonia, which does not appear combustible, can be exploded with oxygen: its hydrogen forming water with that substance. See EUDIOMETRY.

*Evaporating Vessels*.—These are of metal, earthen-ware, and glass. They are generally made broad and shallow, as seen in *fig. 23*, in order to expose a greater evaporable surface. During the evaporation of any liquid, a current of air should constantly be passing over its surface. This object can be easily attained by placing the vessel under the mouth of a chimney into which there is a considerable draught. By this means also the vapour is prevented from coming into the room.

These vessels are of silver for expelling the water from alkalis, and of glass, or Wedgwood ware, for acids and some solutions of salts.

*Sand and Water Baths*.—The sand bath, although superseded by the Argand lamp, for distillations in the small way, is, nevertheless, very useful for digesting substances subjected to solution, and for evaporation. Its heat is much more regular than the naked fire, but it may sometimes be too

hot for substances which are liable to be decomposed, such as infusions of vegetable or animal matters. The most useful sand bath is made of a plate of cast iron, under which the flame of a fire plays, and a rim of cast or wrought iron laid upon it and filled with fine Calais sand.

A sand-bath frequently consists of an iron dish or pan made to fit the mouth of a furnace. See FURNACE.

When an uniform heat, not higher than 212° of Fahrenheit, is required, or when it will be sufficient, the water bath is found highly useful. Instead, however, of placing the substance to be heated in a vessel of boiling water, which was formerly the case, the bath may be heated with steam at any distance from the boiler. This bath may be a vessel of any shape, having a cavity for steam on the outside, thickly covered with flannel, or any bad conductor of heat, and the inside filled with sand. This bath is admirably fitted for the evaporation of solutions of animal and vegetable substances, and for drying precipitates and other substances liable to be decomposed or changed by great heat.

*Matras.*—This is a vessel used for making solutions of substances. It is generally of a spherical form, flattened at the bottom, as seen in *fig. 24*, having a long neck to allow the fluid to condense and return into the vessel. This useful apparatus is made of glass, and thin at the bottom, in order to prevent its breaking. The common Florence flask is a good substitute for the matras. A smaller vessel of this kind is used for boiling a less quantity of any liquid; these are called *proof glasses*. See *fig. 25*.

*Precipitating Glasses.*—See *fig. 26*.—These are tall cylindrical vessels, in which precipitations are performed, in order to collect the separated matter into less room. In washing precipitates it is found, that when hot water is poured into the glass, if the bottom be thick it is liable to break. This evil has existed more or less in all the precipitating glasses in general use. In making this vessel at the glass-house, the part to form the bottom should be blown out thin, like the matras, and then pushed inwards to make it stand firmly. Very small vessels in this shape are used for small quantities of any substance. These are called *test glasses*.

*Gas bottles*, such as *fig. 27*, are vessels for obtaining hydrogen, carbonic acid, and other gases. The materials, such as water and zinc filings, are introduced into the bottle A. The sulphuric acid being put into the bottle B, the plug *b*, which is ground into the neck *d*, can be raised to let in the acid as it may be wanted. The gas escapes through the crooked tube C, which may be put under the shelf of the pneumatic trough.

Funnels are used generally for filtration; they are commonly, and always ought to be ribbed for this purpose, in order to form channels between the paper and the glass, which greatly facilitates the process. In lieu of a ribbed filter, it is common to place a number of straws, or pieces of glass, between the paper and the vessel, which answers very well.

The separatory funnel, *fig. 34*, is used for separating fluids, such as water and oil, which do not mix from the difference in specific gravity.

The following articles are also essential to the laboratory, which it will be unnecessary to describe.

Thermometers and a barometer. Bottle for ascertaining the specific gravity of liquids.

A common still to furnish distilled water.

A small one of silver for nice purposes.

The different blow-pipe apparatus, with platina, spoon, and leaf platina.

A silver crucible, and one of platina.

Crucibles and crucible stands of earthen ware. See *figs. 29, 30*, and *32*.

Muffles and cupels. See *figs. 28* and *33*.

Iron retort and jointed tube for procuring oxygen gas. *Fig. 35*.

Glass jars of different sizes for collecting gases.

Filtering paper, and papers coloured with litmus, turmeric, and red-cabbage.

A general assortment of glasses, to filter liquids into, &c.

An assortment of earthen vessels for common purposes. Those made of the same materials as the soda water bottles are to be preferred.

Capsules of glass, and watch-glasses. The former may be cut out of broken retorts and receivers with a small hot iron.

Glass tubes of different sizes, and a spirit lamp for bending them.

Glass and porcelain rods and spoons for stirring acids, &c.

Jars of glass and earthen ware, with grooves round the top, for luting them closely from the air. These should be used for containing salts in crystals.

Ruled paper for labels; copal varnish to cover the same, to keep off the dampness and fumes of acids.

Sheets and wires of different metals.

Silk and thread of different strength.

Stands made of wood or rushes, for supporting vessels with round bottoms.

Iron ladles of different sizes.

Hammers, shears, and plyers.

Corks, bladders, and sponge.

Tongs of various forms.

Files, diamond, and magnet.

Lutes, linen, cloth, and tow. See LUTE.

The following philosophical apparatus;

Air-pump for condensing and exhauing.

Syringes, microscope, and burning lens.

Electric machine and Galvanic apparatus.

Zinc plates and wire, for minor experiments.

Hydrostatic balance and hydrometer.

We shall conclude this article with a list of the chemical substances necessary to be kept in a chemical laboratory. These are divided into wet and dry substances. The first of these must, of necessity, be kept in well-stopped bottles. The latter should also be kept in bottles, the necks of which should be wider than those for liquids.

Substances in common use should be kept in larger quantity than those which are kept as mere specimens, or only used occasionally and in small quantity.

*Liquids in common Use.*

Sulphuric acid, pure.

----- common.

Nitric acid, pure.

-----, common.

Muriatic acid, pure.

-----, common.

Acetic acid.

Water saturated with ammonia.

Solution of potash.

----- carbonat of potash.

----- potash.

----- super-carbonat of potash.

----- soda, and carbonat of soda.

----- carbonat of ammonia.

Lime water.

Distilled water.

Alcohol,

Alcohol, pure.  
 ———, common.

The bottles in which the above are kept should hold from a pint to a quart each.

After a change of temperature in the air from cold to hot, we find at the tops of bottles, about the stopper, a quantity of the liquid which has distilled up to the stopper, and been forced out by the expansion of the air in the bottle. This is very troublesome, especially with acids, and may be remedied by giving to the mouth of the bottle a slight funnel shape, which forms a recess for the liquid.

The following are the dry substances in common use.

- Oxyd of manganese, and common salt.
- Filings and rods of iron, tin, zinc, copper, and lead.
- Chalk and powdered marble.
- Quick lime, pipe clay, and sand.
- Magnesia, common and calcined.
- Sulphurets of potash, iron, and lime.
- Isinglass and nutgalls.
- Brazil wood and turmeric.
- Calcined plaster of Paris, and bone ashes.
- Black flux and white flux, See FLUX.
- Charcoal powder and saw-dust.
- Sulphat of lead, as a body for lutes.
- Nitre in crystals.
- Borax and alum.

The following are bodies in solution, used as tests and kept in small quantities, in bottles from one to two ounces in size. The bottles should be shaped at the mouth as above recommended, and the diameter should be half the height in the cylindrical part.

- |                      |                               |
|----------------------|-------------------------------|
| Sulphat of potash.   | Oxymuriat of mercury.         |
| — foda.              | Phosphat of foda.             |
| — alumine.           | — ammonia.                    |
| — ammonia.           | Fluat of potash.              |
| — magnesia.          | — ammonia.                    |
| — zinc.              | Borat of foda.                |
| — silver.            | Carbonat of potash.           |
| Oxy-sulphat of iron. | — foda.                       |
| Nitrat of potash.    | — ammonia.                    |
| — foda.              | Acetat of potash.             |
| — barytes.           | — barytes.                    |
| — strontian.         | — strontian.                  |
| — lime.              | — alumine.                    |
| — silver.            | — silver.                     |
| — copper.            | — copper.                     |
| — lead.              | — lead.                       |
| — bismuth.           | Oxyacetat of iron.            |
| Muriat of potash.    | Oxalat of foda and ammonia.   |
| — foda.              | Succinat of ammonia.          |
| — barytes.           | Tratrat of ammonia.           |
| — strontian.         | Prussiat of potash and iron.  |
| — lime.              | — lime and iron.              |
| — ammonia.           | Pure gallic acid in alcohol.  |
| — gold.              | Infusion of galls in alcohol. |
| — platina.           | — of litmus.                  |
| — tin.               | Acetic acid, pure.            |
| — cobalt.            | Hydrosulphuret of potash.     |

The following substances should be kept in the solid state, and free from the contact of air and moisture:

- Sulphat of iron kept in alcohol.
- Muriat of lime.
- Oxymuriat of potash.
- Barytic earth.
- Strontian earth, and all pure earths.
- Pure potash.
- foda.

Potassium and sodium, kept in naphtha. See POTASSIUM and SODIUM.

Sulphurets of potash, iron, and lime.

Phosphuret of lime.

Phosphorus.

Pyrophorus.

It is also proper that the chemist should possess as great a variety of all the known chemical bodies as possible, both simple and compound. They are worth possessing even as a matter of curiosity. But they will be highly valuable in giving a familiar knowledge of the different substances which the experimentalist may expect to meet with, and enable him to distinguish them from what may be new.

LABORATORY of an Hospital, is a place where the chemical, &c. remedies are made up.

LABORATORY, in a Camp, is a tent where the fire-workers and bombardiers prepare their works, drive their fuses, fix their shells and carcasses, make quick-match, &c.

LABORDE, M. DE, in *Biography*, author of an ample and comprehensive work, entitled "Essai sur la Musique, ancienne et moderne," published at Paris 1780, in four vols. 4to. The accumulation of curious materials for this publication is such, as nothing but a long and unwearied diligence could amass. It has, however, frequently given us much concern, in consulting this work, to see the spirit of system operate so strongly on the author, as to affect both his candour and conscience. The critique upon musical writers in the third volume, seems only a vehicle for general censure of all that have not subscribed to the fundamental base of Rameau, the triple progression of the Abbé Rouffier, and praise of all that have. There is no middle state, no music or musical merit of any kind, theoretical or practical, unanctioned by these dogmas. But will M. de Laborde venture to assert, or can he even believe, that till the publication of Rameau's "Système de la Basse fondamentale," and the Abbé Rouffier's "Mémoire sur la Musique des Anciens," there was no good music in the world, or that all which has been produced since, by innumerable great masters in several parts of Europe, who never studied or heard of either, is execrable? That there are great method and merit in the systems of both these theorists, no candid judges of the subject will deny; and perhaps there are few who will not grant that the principles of harmony have not been formed into a code, equally luminous and useful to students, by any other writers, and yet will not shut their ears to all music not built upon their principles. The inconsistency of *individually* praising Italian composers in such glowing terms, and yet seizing every opportunity to censure and sneer at Italians and foreigners in *general*, prove the work to have been compiled by persons of different principles. What a coil is made (v.iii. p. 690.) about a sharp fifth used merely as an appoggiatura, or note of taste, with which the base or harmony has nothing to do, and which, therefore, has no effect on the modulation! And yet M. de Laborde can bear the *quinte superflue*, and have patience to give a rule for its use in composition! Can any one sincerely praise the compositions of Piccini, Sacchini, and Pachello, who is disgusted by those happy licences, in which the very soul of Italian music consists?

M. de Laborde gives us his musical creed in pretty plain terms, (v.iii. p. 639.) in answer to a remark of Mr. Jarnard, who expresses his surprize, that "the Italians, without any formal system, compose better music than the French, who are in possession of the true principles of harmony." This M. de Laborde is so far from granting, that, on the contrary, he is certain the French music, with respect to counterpoint, is infinitely superior to the Italian; and that the Italians sur-

pafs the French in nothing but dramatic music, which is not like other music, fubfervient to the laws of counterpoint!—"We will allow," continues he, "that the Italians are fuperior to us in *melody*; but they in return muft grant, that with refpect to *harmony* we write in a manner fuperior to them in correctness, purity, and elegance." What! fuperior to Leo, Féo, Durante, Ahoſ, Jomelli, Caſtaro, and Manna? But neither melody nor harmony, alone, can conſtitute good muſic, which conſiſts in the union of both; and melody without harmony, or harmony without melody, is as imperfect as a man with one arm, or one leg, to whom nature has originally given two.

With refpect to all the feuds and contentions lately occaſioned by muſic in France, they ſeem to have annihilated the former diſpoſition of the inhabitants to receive delight from ſuch muſic as their country afforded. There are, at preſent, certainly, too many critics, and too few hearers with a diſpoſition to be pleaſed in France, as well as elſewhere. We have ſeen French and German *ſoi-diſant* connoiſſeurs liſten to the moſt exquisite muſical performance, with the ſame *ſang-froid* as an anatomit attends a diſſection. It is all analyſis, calculation, and parallel; they are to be wiſe, not pleaſed. Happy the people, however imperfect their muſic, if it gives them pleaſure! But when it is an eternal object of diſpute; when each man, like Nebuchadnezzar, ſets up his own peculiar idol, which every individual is to fall down and worſhip, or be thrown into the fiery furnace of his hatred and contempt, the bleſſing is converted into a curſe.

LABOUR, in *Agriculture*, the work which is neceſſary to be performed upon a farm, in order to render it fruitful and productive. It is of various kinds, and for the moſt part either performed by hired ſervants or day labourers. Where proper attention is paid by the farmer, to ſee that the labourer underſtands his buſineſs, &c. agricultural labour is probably, in general, beſt done by the piece, or what in ſome places is termed talk-work. The expence or price of labour varies conſiderably in different diſtricts, from particular circumſtances; ſuch as the ſituation, the ſtate of manufactures, the condition of agriculture, the facility of getting employment, and the manner of living. See LABOURER.

In the Survey of the County of Middleſex, it is ſtated, that agriculture may very properly be conſidered as the art of manufacturing the ſoil, and unqueſtionably ranks the higheſt in the claſs of manufactures; ſince it not only makes a greater return for the labour beſtowed, than all the reſt put together, but it is alſo of the firſt neceſſity, the demands for its products being urgent and irrefiſtible. Any other manufactory, Mr. Diron remarks, may be laid down at pleaſure, but agriculture muſt be ſupported, as it is the hinge upon which both our lives and actions turn; and the ultimate and only certain reſource of the ſtate, both for men and money.

In the above point of view the feed-grain, amounting to about 15s. an acre, may be ſaid to conſtitute, according to the writer of the Survey of the County of Middleſex, the raw material. When the corn and ſtraw, produced from this feed, are dreſſed and ſent to market, the greater part of it is then fit for conſumption, and may be called a finiſhed manufacture. The additional value above 15s. is entirely the produce of labour, at leaſt, in a conjunction with the aſſiſtance of nature; but as not one ſhilling could be procured for the natural products of the world, without the application of labour, the whole may therefore be ſaid to be derived from labour; and amounts to about 3l. 5s. an acre, or 1233l. per cent. on the coſt of the raw material. Wheat is ſtill farther manufactured into bread; but, excluſive of

the operations of the miller and the baker, this is certainly not above the average for the produce of the arable land of this county; and ſome parts of Surrey, Kez, and Eſſex, yield in the ſame proportion. The raw material, on an average of the arable of the whole of South Britain, amounts to about 16s. per acre, which is increaſed in value by labour to 5l. or 525l. per cent. Hence the labour beſtowed on fifteen millions three hundred thouſand acres, produce a return of 64,260,000l. ſterling.

And the cattle and implements may, it is ſuppoſed in a manufacturing point of view, be deemed the ſtock; the amount of which, on the meadow-land in this county, is about 4l. an acre, and the produce 10l. The labour and profits of ſtocks, therefore, are 150l. per cent. On a farm purely arable in this county the ſtock would be 5l. and the produce 10l. or 100l. per cent. There are not any grazing-farms in the county; if there were, their ſtock would be greater, and they would not yield fo large an increaſe. The farming capital of South Britain is 5l. an acre, or 200 millions; and its annual produce is about 130, that is, 65 per cent.

He particularizes the annual produce of the ſoil in this way:

The arable lands, as before ſtated,	-	£64,260,000
The hop-gardens make returns to the amount of 30l. an acre, for the produce of labour, or about	-	1,000,000
Nurſery grounds produce upwards of 65l. per acre. Deduct the raw material, and the produce of labour will not be leſs than 60l. on 10,000 acres, is	-	600,000
The fruit and kitchen-gardens are the moſt valuable reſources for labour, and make the greateſt return, probably to upwards of 100l. per acre, on an average of Great Britain; but he only eſtimates them at that ſum on 50,000 acres, is	-	5,000,000
The graſs land and cider counties, cultivated in South Britain, make returns to the amount of 3l. on twenty millions of acres, is	-	60,000,000
The commons, eight millions, at 1s. 3d. an acre	-	500,000
<b>Total</b>	-	<b>£131,360,000</b>

It is not preſumed to offer the foregoing ſtatement, as one that either is, or can be made out with accuracy and precision. But, under all the circumſtances of the caſe, it may, it is believed, be fairly ſtated, that the annual agricultural produce of South Britain is not leſs than one hundred and thirty millions; which muſt be allowed to ſurpaſs all other manufactures that can be brought into competition with it, not only as to the groſs amount, but alſo as to its ſuperior uſefulneſs.

And if it be further ſuppoſed, that there are two millions and a half of perſons employed in agriculture, their average earnings will be, for men, women, and children of all ages, 52l. which is a ſum ſo much exceeding their expences, that it is evident this employment muſt enrich ſociety; and it is equally clear, that it contributes at once its ſurplus, wealth, and population, to make up the deficiencies of the other departments both in men and money. This ſurely places the importance of rural labour in ſuch a point of view, as ſhould urge the cultivation of as much land of the kingdom as poſſible.

LABOUR, in a general sense, imports the exertion of human strength in the performance of any kind of work.

The annual labour of every nation, says Dr. Smith in his "Inquiry into the Nature and Causes of the Wealth of Nations," (vol. 1.), is the fund, which originally supplies it with all the necessaries and conveniences of life, which it annually consumes, and which consist always, either in the immediate produce of that labour, or in what is purchased with that produce from other nations. As this produce, or its value in purchase, bears a greater or a smaller proportion to the number of those who are to consume it, the nation will be better or worse supplied with all the necessaries and conveniences for which it has occasion. This proportion, in every nation, is regulated by two circumstances, *viz.* the skill, dexterity, and judgment with which its labour is generally applied, and the proportion which the number of those who are employed in useful labour, bears to that of those who are not so employed. Whatever be the soil, climate, or extent of territory of any particular nation, the abundance or scantiness of its annual supply must, in that particular situation, depend upon these two circumstances; and chiefly upon the former of them, which has served to improve the productive powers of labour. This improvement has very materially depended on the division of labour, as we may illustrate and evince by a single example taken from a manufacture, that is, on the first view of it, very trifling; *viz.* that of pin-making. A workman, not educated to this business, (which the division of labour has rendered a distinct trade), nor acquainted with the use of the machinery employed in it, (to the invention of which the same division of labour has probably given occasion), could scarcely, with his utmost industry, make one pin in a day, and certainly could not make twenty. But as the business is now conducted, not only the whole work is a peculiar trade, but it is divided into a number of branches, consisting, for the most part, of peculiar trades. One man draws out the wire, another straightens it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head; and the making of the head requires two or three distinct operations; the putting of it on is a peculiar business, and the whitening of the pins is another; the putting of them into the paper is a trade by itself. Thus the important business of making a pin is divided into about 18 distinct operations, which, in some manufactories, are all performed by distinct hands, though in others, the same man will sometimes perform two or three of them. Dr. Smith mentions a small manufactory of this kind, where 10 men only were employed, and where some of them consequently performed two or three distinct operations. But though they were poor, and their machinery indifferent, they could, with exertion, make among them 12 pounds of pins in a day; each pound consisting of upwards of 4000 pins of a middling size; these 10 persons could therefore, among them, make upwards of 48,000 pins in a day; so that each person might be considered as making 4800 pins in a day. But if they had all wrought separately and independently, and without having been previously educated to this peculiar business, they certainly could not each of them have made 20, perhaps not one pin a day; that is, certainly, not the two hundred and fortieth, perhaps not the four thousand eight hundredth part of what they are at present capable of performing, in consequence of a proper division and combination of their different operations. This exemplification is applicable, in a certain degree, and with some modifications, to other arts and manufactories; and it shews that the division of labour, as far as it can be introduced, occasions, in every art, a proportionable increase of the productive powers of labour. The separation of dif-

ferent trades and employments from one another, seems to have taken place in consequence of this advantage. The great increase in the quantity of work, which, in consequence of the division of labour, the same number of people are capable of performing, is owing to three different circumstances; *first*, to the increase of dexterity in every particular workman; *secondly*, to the saving of the time which is commonly lost in passing from one species of work to another; and *lastly*, to the invention of a great number of machines which facilitate and abridge labour, and enable one man to do the work of many. This invention and introduction of machinery seem to have been originally owing to the division of labour. Of machines constructed for abridging and expediting labour, many have been devised by common workmen, who have been employed in some very simple operation, and whose attention has been wholly directed to an easy and ready method of performing it. Many improvements have also been made by the ingenuity of the makers of the machines, when the construction of them became the business of a particular trade; and some by that of those who are called philosophers and men of speculation, whose observation has enabled them to combine together the powers of the most distant and dissimilar objects. A sub-division of employment in philosophy, as well as in every other business, has taken place among persons of this description; in consequence of which dexterity is improved, and time is saved. Each individual, appropriating to himself a particular branch, performs more work upon the whole, and contributes in a considerable degree to augment the quantity of science. It is the great multiplication of the productions of all the different arts, in consequence of the division of labour, which occasions, in a well-governed society, that universal opulence which extends itself to the lowest ranks of the people. Every workman has a great quantity of his own work to dispose of beyond what he himself has occasion for; and every other workman being exactly in the same situation, he is enabled to exchange a great quantity of his own goods for a great quantity, or, which comes to the same thing, for the price of a great quantity of theirs. He supplies them abundantly with what they have occasion for, and they accommodate him amply with what he has occasion for; and a general plenty diffuses itself through all the different ranks of the society.

The division of labour, from which so many advantages are derived, is not originally the effect of human wisdom, which foresees and intends that general opulence to which it gives occasion. It is the necessary, though very slow and gradual, consequence of a certain propensity in human nature which has in view no such extensive utility; the propensity to truck, barter, and exchange one thing for another. As it is the power of exchanging that gives occasion to the division of labour, so the extent of this division must always be limited by the extent of that power, or, in other words, by the extent of the market. When the market is very small, no person can have any encouragement to dedicate himself entirely to one employment, for want of the power to exchange all that surplus part of the produce of his labour, which is over and above his own consumption, for such parts of the produce of other men's labour as he has occasion for. This leads us to observe, that by means of water-carriage a more extensive market is opened to every sort of industry, than what land-carriage alone can afford it; so it is upon the sea-coast, and along the banks of navigable rivers, that industry of every kind naturally begins to subdivide and improve itself; and it is frequently not till a long time after that these improvements extend themselves to the inland parts of the country. If we

advert to fact, we shall find, that the nations which appear to have been first cultivated, were those that occupied the countries around the coast of the Mediterranean sea. And of all these countries, Egypt seems to have been the first, in which either agriculture or manufactures were cultivated and improved to any considerable degree. Upper Egypt extends itself no where above a few miles from the Nile, and in Lower Egypt this great river breaks itself into many different canals, which, with the assistance of a little art, seem to have afforded a communication by water-carriage, not only between all the great towns, but between all the considerable villages, and even to many farm-houses in the country; much in the same manner as the Rhine and the Maese do in Holland at present. The extent and facility of this inland navigation, was probably one of the principal causes of the early improvement of Egypt. The same observation is verified by extending our views to the provinces of Bengal in the East Indies, and to some of the eastern provinces of China, where the Ganges and other great rivers, with a multitude of canals, formed an inland navigation favourable to internal commerce, long before foreign commerce was much, if at all, regarded; the case is very different with respect to the inland parts of Africa, and all that part of Asia, which lies at a considerable distance N. of the Euxine and Caspian seas, the ancient Scythia, the modern Tartary and Siberia, which in all ages of the world seem to have been in the same barbarous and uncivilized state in which we find them at present. See CANAL, COMMERCE, and NAVIGATION.

When the division of labour first began to take place, the power of exchanging, upon which it chiefly depended, must frequently have been very much clogged and embarrassed in its operations. In order to avoid part, at least, of the inconvenience resulting from this state of society, every prudent man, in every period of society, after the first division of labour, must naturally have endeavoured to manage his affairs in such a manner, as to have at all times by him, besides the peculiar produce of his own industry, a certain quantity of some one commodity or other, such as he imagined few people would be likely to refuse in exchange for the produce of their industry. Many different commodities, it is probable, were successively both thought of and employed for this purpose. In the rude ages of society, cattle are said to have been the common instrument of commerce. Thus we find, according to Homer, that the armour of Diomedes cost only nine oxen; but that of Glaucus cost 100 oxen. Salt is said to be the common medium of commerce and exchanges in Abyssinia; a species of shells in some parts of the coast of India; dried cod at Newfoundland; tobacco in Virginia; sugar in some of our West India colonies; hides or dressed leather in some other countries; and Dr. Smith mentions a village in Scotland in which it was not uncommon for a workman to carry nails instead of money to the baker's shop or the alehouse. Metals, however, have been preferred for this purpose to every other commodity; and different metals have been appropriated by different nations to this use. See COIN and MONEY.

After the division of labour has been once thoroughly established, it is but a very small part of the necessaries and conveniences of life with which a man's own labour can supply him. The far greater part of these he must derive from the labour of other people; and he must be rich or poor according to the quantity of that labour which he can command, or which he can afford to purchase. The value of any commodity, therefore, to the person who possesses it, and who means not to use or consume it himself, but to exchange it for other commodities, is equal to the quantity of

labour which it enables him to purchase or command. Labour, therefore, is the real measure of the exchangeable value of all commodities. This, however, is not the measure by which their value is commonly estimated. It is often difficult to ascertain the proportion between two different quantities of labour. The time spent in two different sorts of work will not always alone determine this proportion. The different degrees of hardship endured, and of ingenuity exercised, must likewise be taken into account. But it is not easy to find any accurate measure either of hardship or ingenuity. Hence it happens, that every commodity is more frequently exchanged for, and thereby compared with, other commodities than with labour. When barter ceases, and money has become the common instrument of commerce, every particular commodity is more frequently exchanged for money than for any other commodity. Nevertheless, labour alone, never varying in its own value, is the ultimate real standard by which the value of all commodities can at all times and places be estimated and compared. It is their real price; money is their nominal price only. But though equal quantities of labour are always of equal value to the labourer, yet to the person who employs them, they appear sometimes to be of greater and sometimes of smaller value. He purchases them sometimes with a greater and sometimes with a smaller quantity of goods, and to him the price of labour seems to vary like that of all other things. It appears to him dear in the one case, and cheap in the other. In reality, however, it is the goods which are cheap in the one case, and dear in the other. In this popular sense, therefore, labour, like commodities, may be said to have a real and a nominal price. Its real price may be said to consist in the quantity of the necessaries and conveniences of life which are given for it; its nominal price, in the quantity of money. The labourer is rich or poor, is well or ill rewarded, in proportion to the real, not to the nominal price of his labour.

The real value of all the different component parts of price, says Dr. Smith, is measured by the quantity of labour, which they can, each of them, purchase or command. Labour measures the value, not only of that part of price, which resolves itself into labour, but of that which resolves itself into rent (of land), and of that which resolves itself into profit. In every society the price of every commodity resolves itself into some one or other, or all, of these three parts; and in every improved society, all the three enter, more or less, into the price of the far greater part of commodities. In the most improved societies, however, there are always a few commodities of which the price resolves itself into two parts only, the wages of labour and the profits of stock; and a still smaller number, in which it consists altogether in the wages of labour.

The produce of labour constitutes the natural recompence or wages of labour. In that original state of things, which precedes both the appropriation of land and the accumulation of stock, the whole produce of labour belongs to the labourer; as he has no landlord or master to share with him. If this state had continued, the wages of labour would have augmented with all the improvements in its productive powers, to which the division of labour gives occasion. All things would gradually have become cheaper. They would have been produced by a smaller quantity of labour; and as the commodities produced by equal quantities of labour would naturally in this state of things be exchanged for one another, they would have been purchased likewise with the produce of a smaller quantity. But this original state of things, in which the labourer enjoyed the whole produce of his own labour, could not last beyond the first introduction of the appropriation of land and the accumulation of stock.

As soon as land becomes private property, the landlord demands a share of almost all the produce which the labourer can either raise, or collect from it. His rent makes the first deduction from the produce of the labour which is employed upon land. A second deduction is made by the profit accruing from the produce of the labour that has been so employed. The produce of almost all other labour, in all arts and manufactures, is liable to the like deduction of profit. What are the common wages of labour, depends every where upon the contract usually made between the two parties, to whom belong the profits of stock, and the wages of labour; and the interests of these parties are by no means the same. The workmen desire to get as much, the masters to give as little, as possible. The former are disposed to combine in order to raise, the latter in order to lower, the wages of labour. The masters commonly succeed; for being fewer in number, they can more easily combine; and besides, the law authorizes, or at least does not prohibit, their combinations, while it prohibits those of the workmen. But though in disputes between masters and workmen, the former must generally have the advantage, there is, however, a certain rate, below which it seems impossible to reduce, for any considerable time, the ordinary wages even of the lowest species of labour. The wages of a labourer must at least be sufficient to maintain him; and indeed, on most occasions, they ought to be somewhat more; otherwise it would be impossible for him to bring up a family, and the race of such workmen could not last beyond the first generation. There are certain circumstances, which sometimes give the labourers an advantage, and enable them to raise their wages considerably above the rate already specified; which is evidently the lowest that is consistent with common humanity. When in every country the demand for those who live by wages, labourers, journeymen, servants of every kind, is continually increasing; when every year furnishes employment for a greater number than had been employed the year before, the workmen have no occasion to combine in order to raise the wages. The scarcity of workmen occasions a competition among masters, who bid against one another, in order to get workmen, and thus voluntarily break through the natural combination of masters not to raise wages. This demand for those who live by wages, it is evident, cannot increase but in proportion to the increase of the funds, which are destined for the payment of wages: these funds are of two kinds: first, the revenue which is over and above what is necessary for the maintenance; and secondly, the stock which is over and above what is necessary for the employment of their masters. The demand for those who live by wages, therefore, necessarily increases with the increase of the revenue and stock of every country, and cannot possibly increase without it. The increase of revenue and stock is the increase of national wealth. It is this continual increase, and not the whole amount, of national wealth, which occasions a rise in the wages of labour. Accordingly, it is not in the richest countries, but in the most thriving, or in those which are growing rich the fastest, that the wages of labour are the highest. England is, without doubt, a much richer country than any part of North America; yet the wages of labour are much higher in North America than in any part of England. Although North America is not yet so rich as England, it is more thriving, and advancing with greater rapidity to the further acquisition of riches. The most decisive mark of the prosperity of any country is the increase of the number of its inhabitants. In Great Britain, and in most other European countries, they are not supposed to double in less than 500 years. In North America, it has been found, that they double in 20 or 25 years. Labour is

there so well rewarded, that a numerous family of children, instead of being a burthen, is a source of opulence and prosperity to the parents. The labour of each child, before it can leave their house, is computed to be worth 100*l.* clear gain to them. The value of children is evidently the greatest of all encouragements to marriage. In North America the people generally marry very young; and notwithstanding the great increase occasioned by such early marriages, there is a continual complaint in that country of the scarcity of hands. The demand for labourers, the funds destined for maintaining them, increase, it seems, still faster than they can find labourers to employ. Another circumstance deserves to be mentioned, *viz.* that the price of provisions is every where in North America much lower than in England, so that a family can be maintained at a much cheaper rate. Upon the whole, if the money price of labour be higher there than it is here, its real price, the real command of the necessaries and conveniences of life which it conveys to the labourer, must be higher in a still greater proportion. The liberal reward of labour, as it is the necessary effect, so it is the natural symptom of increasing wealth. The scanty maintenance of the labouring poor, on the other hand, is the natural symptom, that things are at a stand, and their starving condition that they are going fast backwards. The liberal reward of labour, as it is the effect of increasing wealth, is also the cause of increasing population.

It deserves to be remarked, that it is in the progressive state, while the society is advancing to the further acquisition rather than when it has acquired its full complement of riches, that the condition of the labouring poor, of the great body of the people, seems to be the happiest and the most comfortable. It is hard in the stationary, and miserable in the declining state. The progressive state is in reality the cheerful and the hearty state, to all the different orders of the society. The stationary is dull, the declining melancholy. The liberal reward of labour not only encourages the propagation, but it increases the industry of the common people. Where wages are high, we shall always find the workmen more diligent, active, and expeditious, than where they are low: in England, for example, than in Scotland; in the neighbourhood of great towns than in remote country places. Some workmen, however, when they can earn in four days what will maintain them through the week, will be idle the other three. But this is by no means the case with the greater part. Workmen, on the contrary, when they are liberally paid by the piece, are very apt to overwork themselves, and to ruin their health and constitution in a few years. Dr. Smith observes, that if masters would always listen to the dictates of reason and humanity, they have frequently occasion rather to moderate than to animate the application of many of their workmen: and it will be found, he says, in every sort of trade, that the man who works so moderately, as to be able to work constantly, not only preserves his health the longest, but, in the course of the year, executes the greatest quantity of work.

Although the variations in the price of labour not only do not always correspond with those in the price of provisions, but are frequently opposite, we must not, upon this account, imagine that the price of provisions has no influence upon that of labour. The money price of labour is necessarily regulated by two circumstances; the demand for labour, and the price of the necessaries and conveniences of life. The former determines the quantity of the latter which must be given to the labourer; and the money price of labour is determined by what is requisite for purchasing this quantity. Though the money price of labour, therefore, is sometimes high, where the price of provisions is low, it would be still

higher, the demand continuing the same, if the price of provisions were high. It is because the demand for labour increases in years of sudden and extraordinary plenty, and diminishes in those of sudden and extraordinary scarcity, that the money price of labour sometimes rises in the one and sinks in the other. The increase in the wages of labour necessarily increases the price of many commodities, by increasing that part of it which resolves itself into wages, and so far tends to diminish their consumption both at home and abroad. The same cause, however, which raises the wages of labour, the increase of stock, tends to increase its productive powers, and to make a smaller quantity of labour produce a greater quantity of work. The owner of the stock, which employs a great number of labourers, necessarily endeavours, for his own advantage, to make such a proper division and distribution of employment, that they may be enabled to produce the greatest quantity of work possible. For the same reason, he endeavours to supply them with the best machinery which he or they can think of. There are many commodities, which, in consequence of these improvements, are produced by so much less labour than before, that the increase of its price is more than compensated by the diminution of its quantity.

Labour is distinguished by Dr. Smith into productive and unproductive: the former is that which adds to the value of the subject upon which it is bestowed; the latter is that which has no such effect. Thus, the labour of a manufacturer adds, generally, to the value of the materials upon which he works, that of his own maintenance, and of his master's profit. The labour of a menial servant, on the contrary, adds to the value of nothing. Though the manufacturer has his wages advanced to him by his master, he, in reality, costs him no expence, the value of these wages being generally restored, together with a profit, in the improved value of the subject upon which his labour is bestowed. But the maintenance of a menial servant never is restored. A man grows rich by employing a multitude of manufacturers; he grows poor by maintaining a multitude of menial servants. The labour of some of the most respectable orders in the society, is, like that of menial servants, unproductive of any value, and does not fix or realize itself in any permanent subject, or vendible commodity, which endures after the labour is past, and for which an equal quantity of labour could afterwards be procured. The sovereign, for example, with all the officers, both of justice and war, who serve under him, the whole army and navy, are unproductive labourers. They are the servants of the public, and are maintained by a part of the annual produce of the industry of other people. Their service, how honourable, how useful, how necessary soever, produces nothing for which an equal quantity of service can afterwards be procured. The protection, security, and defence of the commonwealth, the effect of their labour this year, will not purchase its protection, security, and defence for the year to come. In the same class must be ranked some both of the gravest and most important, and some of the most frivolous professions: churchmen, lawyers, physicians, men of letters of all kinds, players, buffoons, musicians, opera-singers, opera-dancers, &c. like the declamation of the actor, the harangues of the orator, or the tune of the musician, the work of all of them perishes in the very instant of its production. Both productive and unproductive labourers, and those who do not labour at all, are all equally maintained by the annual produce of the land and labour of the country. This produce has certain limits; and according as a smaller or greater proportion of it is in any one year employed in maintaining unproductive hands, the more in the one case and the less in the other will remain for

the productive, and the next year's produce will be greater or smaller accordingly; the whole annual produce, if we except the spontaneous productions of the earth, being the effect of productive labour. This produce naturally divides itself into two parts: one of these parts, and frequently the largest, is destined for replacing a capital, or for renewing the provisions, materials, and finished work, which had been withdrawn from a capital; the other for constituting a revenue either to the owner of this capital, as the profit of his stock, or to some other person, as the rent of his land. This is the case with respect both to the produce of land and of a great manufactory. The part of the annual produce of the land and labour of any country, which replaces a capital, never is immediately employed to maintain any but productive hands; it pays the wages of productive labourers only. That which is immediately destined for constituting a revenue either as profit or as rent, may maintain indifferently either productive or unproductive hands. The rent of land and the profits of stock are every where the principal sources from which unproductive hands derive their subsistence. And, therefore, the proportion between the productive and unproductive hands depends very much upon the proportion between that part of the annual produce, which, as soon as it comes from the ground or from the hands of the productive labourer, is destined for replacing a capital, and that which is destined for constituting a revenue, either as rent or as profit. The latter part is not only much greater in rich than in poor countries, but bears a much greater proportion to that which is immediately destined for constituting a revenue, either as rent or as profit. The funds destined for the maintenance of productive labour are not only much greater in the former than in the latter, but bear a much greater proportion to those which, though they may be employed to maintain either productive or unproductive hands, have generally a predilection for the latter. The proportion between these different funds necessarily determines in every country the general character of the inhabitants as to industry or idleness. The proportion between capital and revenue seems every where to regulate the proportion between industry and idleness. Wherever capital predominates, industry prevails; wherever revenue, idleness. Every increase or diminution of capital, therefore, naturally tends to increase or diminish the real quantity of industry, the number of productive hands, and consequently the exchangeable value of the annual produce of the land and labour of the country, the real wealth and revenue of all its inhabitants. See on this subject Smith's Causes of the Wealth of Nations, passim.

LABOUR, in *Midwifery*. By the term labour is meant the act of detaching a fœtus or child from the uterus; and during the time this process is going on, the woman is said to be in labour. The exertion or efforts used by the woman, or any other animal, in effecting the expulsion of the fœtus, are called labour pains, or *throes*, a Saxon word, meaning suffering or enduring.

Labour pains return at intervals of longer or shorter duration. In the commencement of labour, the pains only recur once in an hour or two; but as the labour advances, the return of the pains becomes more frequent; and at length they are almost continual, one pain being scarcely finished when another begins: but in this there is a great variety, not only in different women, but in the same woman in subsequent labours.

The immediate or exciting cause of labour is the existence of a fœtus, with its placenta and membranes, in the uterus, now ripe, and fit for exclusion.

Physiologists have in vain attempted to explain why the  
uterus

uterus should bear the burthen of the ovum until the contained fœtus has arrived at its maturity, and should then attempt its expulsion. The most general and prevailing opinion has been, that the fœtus having acquired sufficient size and strength, and finding itself pressed upon, and frightened, it labours to free itself from its confinement, and that the pains are occasioned by its kicking against the sides and fundus of the uterus. But as pains equally strong are excited to expel a dead as a living fœtus, or to force away the placenta after the birth of the child, and as the eggs of oviparous animals are excluded by similar efforts, it is plain the fœtus is passive in the business.

If the bulk of the fœtus was in any way instrumental in occasioning labour, then the period of gestation would vary according as the fœtus happened to be larger or smaller, which, we know, is not the case; except when it is disturbed by accidental circumstances, as by falls, hurts, fever, or other diseases. To every animal there is an allotted time for utero-gestation. This law in the economy of nature is so uniformly attended to, that even when the fœtus is contained in one of the Fallopian tubes; or in a sac, in the cavity of the abdomen, at the end of nine calendar months, the time appointed for women to carry their young, exertions for its exclusion are excited, in the same manner as they would have been if it had been contained in the uterus.

When the fruit is ripe, its connection with the parent tree is gradually loosened, and at length it falls to the ground. When the fœtus has acquired that degree of maturity it is intended to attain to in the uterus, the fibres or vessels that connect the ovum, or bag in which the fœtus is contained, become loosened, and are gradually dissolved or broken; and the ovum, now an extraneous body, would, like the fruit, fall or slide through the vagina, if it were not prevented by the straightness of the passage through which it is to pass. It is for the same reason, viz. that they are become extraneous bodies, that abortions of two, three, four, or more months, are excluded soon after they cease to live.

Labours are divided or distinguished by the terms *natural*, *preternatural*, or *laborious*.

Labours are called *natural*, when the vertex of the head of the child presents to the uterine orifice, the face inclining towards the sacrum, the hind-head towards the pubes of the mother; the size of the head of the child being also so adapted to the pelvis of the mother, that the expulsion of it may be effected solely by the powers of nature, or by the pains, and within the space of a few hours.

Labours are called *preternatural*, when any other part of the child than the head presents to the uterine orifice, as the feet, the breech, a shoulder, or an arm. In all these cases, more or less of manual assistance will be required to complete the birth.

Labours are called *laborious* or *difficult*, in which the head of the child presents, but either in consequence of its offering in a wrong position, or with an ear, or the face to the uterine orifice, or on account of its disproportionate size, or from some disease in the os uteri or vagina, or distortion of the pelvis of the mother, it cannot be brought safely into the world, without great difficulty, or without the assistance of instruments.

*Progress and Management of a natural Labour.*—Two or three weeks before the completion of the term of gestation, the abdomen of the pregnant woman is observed to subside, and become less prominent; there is a secretion of mucus from the glands of the vagina, and perhaps from the cervix uteri. This serves to soften and relax the passage, and to render it more easily dilatate. The uterus sinks gradually lower into the pelvis, and the os externum is fre-

quently, from this cause, in a small degree thrust outward. In some women, slight pains, recurring every three or four hours, are excited in the course of this process; and milk flows from the breasts. These preliminary symptoms occur, but perhaps in a less degree, in preternatural and laborious, as well as in natural labours.

The term of gestation being completed, the fundus uteri begins to contract, and to propel the fœtus downwards, by which the labia of the os internum, called also os tinæ, are stretched, made thin, and at length forced open, at first to the size only of a sixpence, or so as scarcely to admit the end of the fore-finger of the assistant, if he should happen to examine the woman at this time. This advance in the labour is usually announced by the discharge of a thicker mucus than what had been discharged before, and often tinged with blood, effused probably by the small vessels which had contributed to connect the membranes to the cervix uteri. This discharge of mucus tinged with blood is by the women called a *show*.

Though it may be proper, and is usually expected, that the accoucheur or midwife should examine into the state of the uterus, early in labour, by passing the fore-finger of his right hand, anointed with lard, into the vagina, in order to discover what part of the child presents to the os uteri, and to repeat the examination every hour or two, to ascertain the progress of the labour; yet having found it is the head of the child that presents, and that there is no unnatural obstacle to the birth, he must be careful to do this in so gentle a manner as to give no pain to the woman; and he is on no account to attempt to hasten the dilatation of the os internum, or any part of the passage, that being only safely to be done by the natural pains.

By the continuance of the uterine contractions, aided by that of the diaphragm and muscles of the abdomen, the orifice at the womb becomes more and more thin and dilated, until it is sufficiently open to admit, during the pains, a portion of the membranes, filled with the liquor amnii, or fluid in which the fœtus is suspended. This bag, which is gradually enlarged, contributes materially in opening the uterine orifice, until it becomes sufficiently extended to admit the vertex of the head of the child, when it usually bursts, and the contained fluid rushes forth generally with violence. The women call this the *breaking of the waters*, and they expect the birth of the child will soon follow; and if the business has been entirely left to the agency of the pains, this usually happens in the space of one or two hours.

After the bursting of the membranes, there is usually a suspension of the pains for the space of ten or fifteen minutes, when they are again renewed, and the head of the child is forced down, until it presses against the perineum and the os externum, or outward orifice. In descending to this position, the head of the child makes a half turn, to bring the forehead to the sacrum, the hind-head to the pubes of the mother. The perineum of the woman becomes now so much distended, that the distance from the edge or frænum of the os externum to the anus amounts to three inches, or more. The pains now become more strong and frequent, distending and enlarging the os externum, until it is sufficiently opened to allow a passage for the head of the child, which is at length forced into the world, when it is usual to say the head of the child is born. The pains are now again suspended for the space of ten or fifteen minutes, during which time the fundus uteri gradually contracts, until it comes again into contact with the breech of the fœtus. Two, three, or more pains are required to expel the shoulders; and as many more to bring the re-

mainder of the body of the child into the world. The child being born, the woman now enjoys a degree of happiness, of which, if it be her first child, she had never been conscious before. But her trouble is not completely over; for at the end of fifteen, twenty, or a few more minutes, fresh pains arise, but not so violent as those she had before experienced. By these the placenta is gradually loosened from the uterus, and thrust down into the vagina, and at length expelled from the body.

After the birth of the child, but particularly after that of the placenta, there is a considerable discharge of blood, particularly from the placenta, but, principally, from the uterus. This is called the lochia, and it continues flowing, in greater or less plenty, for five, six, or more days; diminishing every day in quantity, and becoming thinner and paler, and is at length colourless. This is occasioned by the gradual contraction of the vessels of the uterus, which continues until that viscus is reduced to nearly the size it was before the woman conceived.

With first children, and, in a few instances, with subsequent births, this contraction of the uterus goes on almost imperceptibly to the woman, more ordinary pains are excited, similar to labour pains, and are called *after-pains*. As they are not attended with danger, and generally subside, and entirely cease by the end of three or four days, it is not often found necessary to attempt appeasing them by medicines; but when they are unusually frequent and violent, preventing sleep, they may be quieted by opening the bowels with some purging medicine, as castor oil, an infusion of fenna, with some of the neutral salts, or by an emollient and opening clyster, and at night giving a draught with ten, fifteen, or twenty drops of the tincture of opium.

The above is the usual progress of a natural labour, but there is a great variety in the number, strength, and frequency of the pains required for the expulsion of the child in different women, as well as in the time taken in completing the labour, which in some women is effected in a few minutes, and with very little pain; more ordinarily, it takes from two to six, eight, or ten hours. In some cases, when the pains are tardy, the term may be extended to twenty-four hours. If delayed beyond that time, the labour will be denominated laborious or difficult, as some assistance will be required to hasten the birth, lest the soft parts of the mother should be hurt, or the strength of the child exhausted, by its too long continuance in a straitened situation.

During the progress of the labour, the woman is to be allowed to be sitting, walking, or lying down, as she feels herself most disposed. The friends about her, and perhaps the nurse, generally advise her to hold in her breath, and to press down as strongly as she can with every pain, and to enable her to do this, they are incessant in offering her caudle, or other heating drinks. But these things are not only unnecessary, but likely to do mischief. The accoucheur or midwife will therefore interpose his advice. They must take care to keep the room cool, and not permit more than one or two of the friends of the woman to be in the room together. They may assure the parturient woman, that the pains are of themselves sufficient for the expulsion of the child, and that by endeavouring to increase their force, she will only unnecessarily fatigue herself; and that by taking warm spiced drinks, she will become hot and feverish, the parts will become more irritable and tender to the touch, whence she will indeed suffer more pain, but the birth of the child, instead of being accelerated, will be retarded, and rendered more difficult.

To assuage her thirst, if that should be troublesome, toast

and water, baum-tea, or any similar beverage, will be much more useful than wine or other heating drinks.

If she is costive, and feels uneasy from that cause, an emollient and gently opening clyster may be advantageously administered. When the pains become more strong and frequent, and from the complaints of the woman it is apparent that the head of the child is fast descending, it will then be proper that the woman be laid on the bed, either on one side or at the foot of it, according as the nurse has arranged it. The usual and most convenient posture for the woman is, that of lying on her left side, her head and shoulders raised, her knees drawn up to her belly, and with her feet supported on the knees of an assistant, or pressing against the bed-post. She is now to be covered with such a portion of the bed-clothes, as the season of the year, or the temperature of the air, may seem to render necessary. The accoucheur will sit down behind her, and taking advantage of a pain, he will introduce his fore-finger into the os externum, which, if the labour is as far advanced as has been supposed, he will find on the full stretch, and the perineum much distended. This is the only part in which the assistant need or ought to give any manual assistance in a natural labour. It will now be his duty to endeavour, with the greatest care and diligence, to prevent a rupture of the frænum, and of the perineum, which may happen if the head of the child should be allowed to pass into the world with too much rapidity. This distressing accident, which, when the rupture is considerable, extending to the anus, is hardly remediable by any art, rarely happens but with a first child, nor often perhaps with first children, but when means have been used, early in labour, to accelerate the birth. With the view of preventing it, if, on examination, the os externum and the perineum shall be found to be strongly pressed upon, and distended during the pains, and yielding with difficulty, the accoucheur must seriously admonish the woman to moderate her exertions, assuring her, at the same time, that the child will speedily be born. During the pains he must surround the part of the head of the child which protrudes, or is in the world, with the fingers and thumb of his right hand, the points of them resting on the edge of the os externum. In this position, the end of his thumb will touch the frænum, the part likely to give way first. If he finds that part too much distended as to be in danger of bursting, he will resist the further descent of the head during the pain. This operation will be assisted, by keeping his left hand, covered with a cloth, firmly pressed upon the distended perineum. When one-half of the head of the child has, by this cautious procedure, been conducted into the world, the accoucheur will find the occiput of the child rising upwards, turning on the pubes of the woman, and drawing the forehead and face from under the perineum. The head of the child being born, it is usual with midwives to draw the shoulders and the rest of the body soon after. But experience has shewn, that it is safer and better to wait for the return of the pains, as during the suspension of them, which lasts, as has been before mentioned, fifteen or twenty minutes, the fundus of the uterus contracts and descends until it comes again in contact with the breech of the child. By this means the sinuses and vessels of the uterus are gradually emptied, and diminished in size, whence one of the causes of inordinate hæmorrhage is removed, at the same time the placenta is loosened and prepared for its exit. The first two or three pains occurring after the birth of the head of the child, are usually expended in giving a favourable turn to the shoulders, *viz.* in bringing one of them to the pubes, and one to the sacrum of the mother; they are then gradually forced into the world, and soon after the rest of the body

the accoucheur using the same precautions in supporting the perineum, as has been recommended during the passage of the head.

The child usually announces its birth, by crying more or less violently according to its strength. This serves to open the vessels, and to facilitate the circulation of the blood through the lungs. The child may be allowed to lie some minutes under the clothes, before separating it from the placenta, taking care that none of the clothes lie upon its face, which might impede its respiration. In that interval the assistant will lay his hand upon the abdomen of the mother, which, if there should be another child, he will find nearly as much distended as it was in the commencement of the labour. In that case, it will be necessary, having previously disposed of the first child, that he make a ligature on the end of the funis, which hangs out of the vagina of the woman, but he is on no account to make any effort to bring away the placenta or membranes, which are usually found to be adherent to those containing the twin. As soon as the pains re-commence, which they usually do at the end of three or four hours, (though sometimes they do not return until six, eight, ten, or more hours,) the accoucheur will pass the fore-finger of the right hand into the os uteri, to discover the position of the fœtus. If the head presents, he will conduct the labour in the manner above described, but as the parts have been previously completely opened, there will be less difficulty to the woman, and less danger of any accident happening to the perineum. If the face, or any other part than the head of the child should present, it will be necessary that he immediately proceed to turn the child, and deliver it by the feet, in the manner to be described under the article *LABOUR, Præternatural*. If there should not be a second child, the abdomen, particularly the upper part of it, will be found loose and flaccid, and the accoucheur will perceive the fundus uteri contracted to the size of the head of a child.

The more the uterus is contracted, and the lower it is sunk down in the abdomen, with so much the greater ease and safety the placenta will be expelled. The assistant will now make a ligature upon the funis umbilicalis, or navel-string, about five inches from its insertion into the navel of the child, and having done this he will, with a sharp pair of scissors, divide the navel-string, about an inch beyond the ligature, leaving the other end of the funis hanging out of the vagina. Having then examined the child to see that it is perfect, and that no blood escapes through the ligature or the funis, he will place it in a proper receiver (a flannel cap being first put upon its head) and deliver it to the nurse. By this time, or soon after, the woman will have a bearing pain, pressing down the placenta, or perhaps, at first, only forcing away a clot of blood. During this and subsequent pains, the assistant will aid their effect, by drawing down the funis. If, after waiting twenty or thirty minutes, the placenta should not come away, he will pass his fingers, or, if necessary, his hand, into the vagina, until he gets hold of the placenta, and by this means he will usually easily extract it. It sometimes happens, though rarely, if the labour has been properly conducted, that the cervix of the uterus contracts, and prevents the descent of the placenta, and sometimes the placenta continues adherent to one side, or to the fundus of the uterus, long after the birth of the child. In either case, the accoucheur must pass one of his hands, gradually and slowly up into the uterus, until it reaches the placenta, when the fingers, and by degrees the whole hand, must be insinuated between the placenta and the uterus, until it be completely separated; it must then be brought down to the vagina, whence it will be easily extracted by the funis.

In this case the discharge of blood will be sometimes so great, as to endanger the life of the woman. This accident rarely happens but when the birth has been improperly and preposterously accelerated, by giving assistance, as it is called, in the early part of the labour; that is, by dilating the os internum and vagina during the pains, to make room for the head of the child to come down; by giving the woman hot and stimulating drinks to increase the pains, and by advising her to bear down strongly during the pains. As the uterus may from exhaustion have become torpid, and not disposed to contract, so as to lessen the capacity or size of the blood-vessels, large flannels wrung out of cold water, to which about a fourth part of vinegar has been added, should be laid over the abdomen, and over the os externum of the woman. These applications must be renewed every five or six minutes, or as often as they become warm, and they will usually have the effect of exciting the action of the fibres of the uterus, on which the cure entirely depends. In the mean while the woman is to be kept, if practicable, in a quiet and easy posture, her head only moderately raised, and covered with a single blanket, the door, or one of the windows of the room being opened, and every five or six minutes she should take a spoonful or two of a mixture, consisting of six ounces of distilled water, half an ounce of spirit of nutmegs, as much syrup of red poppies, fifteen drops of the tincture of opium, and as much of the vitriolic acid as will make it grateful to the palate. By these means the heat of the body will be diminished, and the rapidity of the circulation checked. When the pulse, which was scarcely to be perceived while the discharge was violent, begins to acquire strength, and on examination it appears that little or no blood now flows from the vagina, the cold and wet cloths may be removed, the proper clothes may be put upon the woman, and she may then be placed in the bed in such a position as may be most agreeable to herself.

The process by which a child is produced, or brought into the world, is with great propriety called *labour*, as it is rarely effected without considerable exertion, which has the usual effect, that of exhausting the strength and spirits of the woman. These are to be recruited in the same manner as if the waste had been occasioned by any other kind of exercise; *viz.* by rest, and by taking a moderate portion of plain and simple food at small intervals. In the choice of their food, the women may generally be allowed to consult their own tastes, which will rarely, at such times, incline them to spiced meats, or to drinks that are heating. It will be proper that they be kept in a recumbent posture for the first four or five days, only leaving their beds so long as may be sufficient to open and refresh them. By that time the vessels of the uterus will be so much contracted, as to remove all danger of hæmorrhage, or of an inconvenient descent of that viscus, which is sometimes the consequence of leaving the bed too early. It is proper also, on the second, or at the latest, on the third day after being delivered, to procure stools, either by such purging medicines as have been before described, or by giving a clyster. By this means the fever which is usually excited by the secretion of the milk will be moderated. This, which is called the *milk-fever*, is of short duration, lasting only three or four days, and is not attended with danger. In the cure nothing is required but to keep the body open, and to supply the patient with diluting drinks, taken warm, with the view of inducing a gentle perspiration. The child should be put to the breasts a few hours after the completion of the labour, that it may get some mouthfuls of the thin whey-like fluid which is at first secreted. This will stimulate its bowels, and enable them to discharge the meconium, or black  
viscid.

viscid excrements with which they are always filled. It will also keep the breasts of the mother from being too much distended, the pain occasioned by which, if it is not the cause, yet it certainly tends to increase the milk-fever.

But there is another fever to which women are at this time subjected, which is attended with considerable danger, and which not infrequently proves fatal. It is called, from an opinion that it is peculiar to this state, the *puerperal-fever*. Its commencement is almost always marked by a strong shivering fit, which is followed by a quick pulse, head-ache, lassitude, and dejection of the spirits. It sometimes makes its attack during the labour, more frequently on the next or subsequent day. It is sometimes mistaken for the milk-fever, but besides that its attack is earlier than that of the milk-fever, which never comes on until the third day after delivery, the secretion of the milk is in this fever interrupted, and the breasts, instead of being full and turgid, remain flaccid. From after pains, with which it is sometimes confounded, it is to be distinguished by the quickness of the pulse, arising very soon to 120 strokes in a minute, by the head-ache, nausea, and other concomitants of fever. Tenderness of the abdomen, increasing to extreme soreness and pain, soon come on, which are increased by drawing in the breath, and are rendered almost intolerable by coughing. As there is always a high degree of inflammation of the peritoneum present in this fever, and perhaps of some of the contained viscera, we cannot be too early in taking away eight, ten, or twelve ounces of blood from the arm, according to the strength of the patient. If the abdomen appears distended, attended with soreness and pain, six or eight leeches may be advantageously applied to that part, which may be afterwards fomented with flannels wrung out of a decoction of camomile and marsh-mallows moderately heated, and then covered with a poultice made with linseed-meal. A draught with infusion of fenna and some neutral salt may be given to procure two or three stools. The bowels may afterwards be kept open, and the pain relieved by giving a drachm of purgmg salt with two or three drops of the tincture of opium, in a sufficiency of water to dissolve the salt, every two or three hours. There are few cases that will require or bear a repetition of the bleeding. If, however, the pulse should appear to be strong, and the pain, with the difficulty in breathing, require it, that may be done on the second or third day, and a blister may be applied over the part of the abdomen which is most distended. A blister applied to the nape of the neck, succeeds remarkably in relieving the pain of the head. There is rarely delirium, at the least not to any considerable degree, attending this fever. The patient should be nourished with light broths, panada, and such like mild food, and drink barley-water, gruel, baum-tea, toast and water, or, where preferred, table-beer. By persisting in the use of these remedies, the fever is frequently subdued by the end of four, five, or six days, when recourse may be had to a light decoction or infusion of Peruvian bark, Colombo, or some other tonic taken twice in the day to recruit the strength. Too often, however, these and all other means that have been devised prove insufficient, and the patient dies, sometimes as early as the third or fourth day; at others, not until the sixth, eighth, tenth, or twelfth day. Puerperal fever is by no means to be considered as solely the consequence of tedious and difficult parturition; it full as often makes its attack after natural, easy, and expeditious labours, on which account it was thought proper to delineate the history and treatment of it here, rather than at the end of this dissertation.

Puerperal fever occurring in lying-in-hospitals, or where a

great number of sick or wounded persons are confined, at some times, that is, under certain dispositions and temperatures of the atmosphere, becomes infectious, almost every person delivered in the ward where the fever rages partaking of it in a greater or less degree. At such times, a larger proportion than usual of those who are delivered in their own houses are subjected to it. When it has made its way into a lying-in ward, the women should be removed, and separated, where it can be safely done, and no more persons admitted until the ward has been well ventilated and purified. It is recommended, that the floors be scoured, the walls and ceilings scraped and lime-washed; that the beds be taken down, and the bed-clothes, and the whole room be exposed to the vapour of burning sulphur, or fumigated with the vapour of the marine or nitric acid. All this may with safety and propriety be done, but experience does not warrant us in saying that they have any effect in extinguishing the fever, which, like the yellow fever, or the plague, does not, it is probable, quit the places where it has made its appearance, until the temperature, or other quality of the atmosphere, to which, perhaps, it owed its origin, is changed.

It sometimes happens that women are troubled with hæmorrhage, or discharges of blood from the uterus, during pregnancy, recurring at intervals of two, three, four, or more weeks. Such discharges happening early, that is, within the first, second, or third month of gestation, usually terminate in *abortion*, which see. When the hæmorrhage makes its first appearance in the fifth or sixth month, or later, if it is not very violent or frequent, the woman may go on to the end of her term. The immediate cause of the discharge is a partial separation of the placenta from the uterus; and it may be occasioned by taking too much exercise, by reaching down any article placed at an inconvenient height, by frequenting assemblies or crowded rooms, by dancing, also by any sudden fright or alarm, or by falls, blows, or other accidents. To whatever cause hæmorrhage may owe its origin, it is only to be restrained, and the ill effects of it to be prevented, by rest and retirement, and by avoiding all occasions of exertion; by keeping the air of the room of a moderate temperature, and using a diet that is plain, simple, and easy of digestion. If colicve, the body should be kept open by the use of mild cathartics, or glysters. When a contrary habit of body prevails, and the patient is disturbed with purging and griping pains in the bowels, a dram of any purging salt dissolved in two or three spoonfuls of water, with three or four drops of the tincture of opium, given every two or three hours, rarely fails of appeasing the tumult, and of restraining the hæmorrhage. But though the discharge may by these means be checked, it will return on the commencement of labour; on which it will have so much influence, that even when the presentation of the child should be such as to bring it under the class of natural labour, yet it will be necessary, in conducting it to its termination, to deviate considerably from the rules that have in those cases been recommended.

On examining, it will be found that the os uteri, in the earliest stage of the labour, is more open, soft, and yielding, than in ordinary cases; the pains are also generally less bearing and efficient. It will therefore be proper to assist in dilating the opening, by gently moving the end of the fore-finger round its edge. If it is the head of the child that is coming down, which will be easily perceived through the membranes, and the discharge of blood is not constant, or very considerable, it will be best to let it come in that posture; continuing, at intervals, to assist in dilating the os uteri. When that orifice is completely dilated, so as to ad-

mit the head of the child, the membranes may be opened, by scratching them with the nail of the fore-finger, that the waters may be discharged. This will enable the uterus to contract, and press the placenta against the head or body of the child, and so stop the further effusion of blood. The completion of the labour may now be effected by the pains, as in common cases. The placenta being in part detached, usually comes down soon after the birth of the child. If, however, it should be delayed, and the discharge of blood continue, it may be brought away in the manner before described. But when the discharge of blood is so considerable as to endanger the life of the woman, (and this will be the case when the placenta is placed near to, or, as it sometimes happens, part of it lies over the os uteri,) then it will be necessary, even although the child is coming down in a natural posture, as soon as the os uteri is sufficiently dilated, to break the membranes, or to pierce through the placenta, and gradually and slowly to pass first the fingers, and then the whole of the hand through the rupture into the bag, and to take hold of the feet of the child, and bring them down into the vagina. Time must then be given that the uterus may contract, so as to press upon the head and shoulders of the child, when the labour must be completed in the manner described under the next article.

It sometimes happens that, on the bursting of the membranes, the funis umbilicalis or navel-string falls down into the vagina, before the head or other part of the child that presents. In this case, it has been usual to recommend that the prolapsed funis be folded in a piece of soft linen, and returned into the uterus: but experience has shewn, that however carefully this be done, it constantly returns in a few minutes. If the accoucheur should be present at the time of the rupture of the membranes, or soon after, and find a pulsation in the navel-string,—a sure sign that the child is living, he will then, in whatever posture the child may happen to present, treat it as a preternatural labour; that is, he will pass his hand into the uterus, and turn the child, and bring it by its feet: for if the business be left to nature, the pressure on the funis will put a stop to the circulation of the blood, and the child will die long before it would be expelled by the pains.

In some irritable constitutions, the women become convulsed in the course of the labour. This accident more frequently occurs with first than with subsequent children. At whatever time convulsions make their attack, they never completely leave the woman until the labour is over, and sometimes not until the next or subsequent day. In very mild cases, the brain seems but little affected by the convulsions, which partake of the nature of hysterical complaints. These cases are easily curable, or give way spontaneously when the labour is completed. More commonly the convulsions are attended with coma, and other affections, indicating oppression on the brain. These are of more difficult management, and often prove fatal even under the most cautious and judicious treatment. Of whatever nature, or from whatever causes puerperal convulsions may proceed, they assist very much in forcing down the child.

At whatever period or state of the labour the accoucheur may be called in, he will generally find it expedient to take away six, eight, ten, or twelve ounces of blood from the arm; and in the space of two hours after, (unless the child is coming into the world,) this should be followed by a Clyster to empty the bowels. After the operation of the Clyster, from twenty to thirty drops of the tincture of opium may be advantageously given, which will generally succeed in making the fits less frequent and violent. The labour must now be conducted in the same manner it would have

been, if it had not been interrupted by the convulsions. If the child presents in a natural posture, and the pelvis of the woman is of the natural form and dimensions, it will be found that the convulsions have assisted much in dilating the os internum, and in accelerating the completion of the labour. If any other part than the head of the child presents, as soon as the internal orifice is sufficiently dilated, the accoucheur will pass his hand into the uterus, and turn the child, and bring it by its feet. If, on the other hand, the birth of the child should be retarded, rendered difficult, or impossible, without the aid of instruments, from distention of the bones of the pelvis, the accoucheur will use the lever, forceps, or crotchet, whichever shall be required, in the manner directed under the article *LABOUR, difficult*.

*LABOUR, Preternatural.* In all preternatural labours, the descent of the uterus and the dilatation of its orifice proceed more slowly than in natural labours: hence it often happens that the part of the child presenting cannot be distinctly perceived, even though the woman has been several hours in pain. If, therefore, on examining a woman in labour, during a pain, whose pelvis is of a proper form and dimension, no part of the child can be perceived, the accoucheur may be assured that it is some other part than the head that is coming down. Nothing, however, will be necessary to be done in this case, until the child is so far thrust down by the pains, and the os uteri is so much dilated, as to enable him to perceive the presenting part through the membranes, or until, by the bursting of the membranes, and the discharge of a part of the liquor amnii or waters, a part of the child is forced into the pelvis. If the breech, or one or both of the lower extremities are coming down, the operator will leave the expulsion of the child principally to the effects of the pains, only giving the assistance directed under the articles *BREECH* and *FEET Presentations*. But if the shoulder, arm, breast, or any portion of the upper part of the trunk of the child shall be found to have entered the os uteri, by the general consent of practitioners, the child must be turned, and extracted by the feet. To effect this, the accoucheur will immediately, and before the whole of the waters are drained away, pass his hand slowly and gradually into the uterus, until he comes to the feet of the child, which will often be found at or near the fundus, and grasping them in his hand, bring them down into the vagina; then pausing a little while, still holding the feet in his hand, he will, by another effort, bring them through the os externum, or into the world.

\* This operation, if undertaken soon after the bursting of the membranes, will generally be performed with great ease and safety, and with little pain to the woman: but if it be not begun until the waters are entirely evacuated, and the uterus is contracted, and come into close contact with the body of the child, it will require a much greater degree of force to introduce a hand so far into the uterus, as to be enabled to take hold of the feet of the child; and the whole of the delivery will be attended with much more pain, difficulty, and hazard.

From a due consideration of these circumstances, the following practical inference may be drawn, *viz* that whenever, on examining a woman in the commencement of labour, no part of the child can be felt, or, if felt, not so distinctly as to enable the accoucheur to decide whether it is the head that is presenting, he should by no means leave the woman, or be far absent from her, that he may be at hand to turn the child, if necessary, soon after the bursting of the membranes. But supposing this opportunity to have been neglected, or the accoucheur not to be sent for, until nearly the whole of the liquor amnii or waters are drained off, and

the uterus has contracted so as to come into contact with, and strictly to embrace the body of the child, yet, even in these cases, if the pelvis of the woman is of the proper form and dimensions, and the child is not disproportionately large, by proceeding slowly and cautiously in the manner about to be described, the resistance of the uterus may be overcome, and the delivery effected with perfect safety to the mother and child.

*Method of turning a Child in the Uterus, in preternatural Labours, and bringing it by the Feet.*—The woman being laid across the bed, on her left side, with her knees drawn up to her belly, a woman sitting on the side of the bed, to hold her feet, and keep her steady, the accoucheur must introduce, first one, then a second, third, and fourth finger of either of his hands, anointed with hog's lard, into the vagina, which he will gradually dilate, so as to make room for his whole hand, with which he will still further dilate the passage. Then, pausing a little while, until the straining, on the part of the woman, which the introduction of his hand will have occasioned, shall have subsided, he must again push his hand gently upwards, until it has passed the brim of the pelvis and entered the uterus; then, again pausing until the woman ceases to strain down, he must again push his hand upwards in the intervals between the pains or strainings of the woman, until he reaches one or both of the feet of the child, at which time the whole of his arm nearly, to the elbow, will be in the passage.

When the resistance of the uterus has been very great, it sometimes happens that the hand of the operator is so cramped and benumbed, that he has no power to grasp and bring down the feet of the child. In that case, he must slowly and gradually withdraw his hand, and wait some minutes until he has recruited his strength, and the woman is a little refreshed, and then re-introduce the same, or his other hand, with whichever he thinks (from the knowledge he has now acquired of the position of the child in the uterus) he shall be best able to complete the delivery. This re-introduction of his hand he will be able to effect much more easily than before, the uterus being somewhat stretched and loosened by his former effort. He will now sedulously endeavour to get hold of, and bring down, both the feet of the child; but if that is absolutely impracticable, he must be contented with one of them, which he will bring down slowly, and by intervals, as he had introduced his hand. It will sometimes happen that the operator will not be able in this way to bring the foot into the world, the contraction of the uterus around the body of the child being so considerable, as to prevent its turning by any effort he can make in this way. He must then withdraw his hand, and, after recruiting his strength, return it again into the vagina, with a noose or fillet over it, until he has got hold of the foot of the child, and then, with the fingers of his other hand, push up the noose until it passes the ankle of the child, by which means he will have a double purchase; then drawing down with the end of the fillet that hangs out of the vagina with one hand, and with the other grasping and pulling down the foot, he will usually, in a few minutes, succeed in bringing the leg of the child through the external orifice.

The operator may now again pass his hand up into the uterus to search for the other foot of the child, and bring it also down; or, not succeeding in this attempt, he will wrap the leg that is in the world in a soft cloth, and draw it downward steadily with both his hands, and with sufficient force to bring the breech of the child into the vagina. He will now pause a few minutes, both to allow the woman to recover her strength and spirits, and to give time for the uterus to contract, and come again in contact with the head and

trunk of the child; then, renewing his efforts, he will continue drawing down the thigh, until the breech has freed the external orifice. He must now examine the posture of the child, and if the fore-part of the child lays to the pubes of the mother, he will turn it round to the sacrum; then taking hold of the breech with both his hands, he will continue drawing downward steadily, at the same time moving it from side to side, until the whole of the body is born; he will then pass a finger first along one, and then the other arm of the child, to the joints of the elbows, and draw them down, and if the child be now living, which may be known by a pulsation being felt in the navel-string, he will hasten the birth, drawing down steadily and strongly by the shoulders. If he finds much resistance, with a view of accelerating the birth of the head, he must pass the fore-finger of his left hand along the back part of the vagina to the mouth of the child, and draw down the under-jaw, at the same time that he extracts by the shoulders with his right hand. The child being born, he will complete the delivery, in the manner directed under the article *LABOUR, Natural*.

Some writers and teachers of midwifery are very particular in prescribing the posture in which the woman should be placed as most convenient for the operator in turning a child, which they think should vary according to the position of the child in the uterus, as whether the face or fore-parts of the child be turned to the back, belly, or one of the sides of the mother; they also, from the same circumstances, determine which hand will be most proper for the accoucheur to use in performing the operation. But as the exact position of the child can rarely or never be known until the operator has actually introduced his hand into the uterus, there seems no necessity for embarrassing him with regulations of this kind. The most convenient posture will generally be found to be that in which women are usually placed in a natural labour, and, as has been now described, *viz.* lying on her left side, with her knees drawn up towards her belly, her feet in the lap of an assistant. In respect to which hand the operator should use, he will be guided by circumstances, or by his habit or custom: most persons using one of their hands more dextrously than the other. The most important rule is, that the whole operation be performed slowly and gradually. Other writers have advised that we by no means attempt to turn a child in the uterus, so long as the woman continues to have pains, lest the uterus should be ruptured. But as, at every pain, the uterus contracts, becomes thicker, embraces the body of the child closer, as well as thrusts the presenting part lower into the pelvis, it is evident that by waiting the difficulty of performing the operation will be increased. It will be sufficient, in addition to what has been said of the necessity of proceeding slowly and leisurely, to warn the operator only to push his hand on in the intervals of the pains.

It was supposed, by the early practitioners of midwifery, that when an arm of the child presented, and became considerably swelled, which it always is, when it has continued long in the vagina, that it so filled up the passage, as to add very much to the difficulty of passing a hand into the uterus, and sometimes even rendered it impossible to be done, until the arm was removed; and, accordingly, it was pretty much the practice in the beginning of the last century, first to attempt returning the arm into the uterus, but as that was rarely or never practicable, it was usual in these cases to make an incision through the integuments, under the arm-pits of the child, with a pair of scissors, or a scalpel, and then twist off the limb; and in this mutilated state the children were sometimes born alive. This practice has long since been abolished; experience having shewn, that the obstacle

obstacle opposed by the tumid arm is very inconsiderable, only affecting the first part of the operation, and by perseverance is easily overcome.

We have been lately told, by a practitioner of eminence, that when an arm or shoulder presents, and, by the continuance of the pains, has been thrust so low into the pelvis, that it is absolutely impracticable to turn the child (where the pelvis of the mother is too narrow to admit the hand of the operator, we presume the writer means), that by passing a blunt hook over the neck of the child, and drawing down strongly to separate the vertebræ of the neck, and then twisting the hook round, the integuments of the neck will break, and the head be dissevered from the body, which may afterwards be drawn away with the crotchet. From the facility with which this operation is said to be performed, it is to be feared, that persons of less skill and sagacity than the writer here alluded to, may be tempted to try the experiment on children supposed to be dead, but which are not so, or when there is sufficient room in the pelvis to bring away the child without mutilating it, and thus some lives be lost that might otherwise be preserved. This operation, therefore, should never be performed but in consultation.

It has in a few cases happened, when an arm or shoulder presents and enters first into the pelvis, and the woman has been neglected, or the assistant, not being called in time, was not able to turn the child, that by the continuance of the uterine contractions, or pains, the breech has been gradually forced down, the head and shoulders receding and mounting upwards, and in this posture, *viz.* breech foremost, the child has been expelled. This turning of the child in the uterus, by the sole agency of the pains, has been called by Dr. Denman the spontaneous evolution of the fœtus, and it has sometimes happened, we are told, that the child has, in this way, come into the world alive. It is well, as Dr. Denman justly observes, to know these facts, as in some extreme cases it may afford consolation both to the patient and the attendant; but the excitement of the uterus must be very great indeed to induce a practitioner, who regards either his fame or his feelings, to trull to such an event, as in a great majority of cases the child would be lost, and not uncommonly the woman would lose her life also.

It sometimes also happens, in cases where the arm, shoulder, or breast of the child presents, and the expulsion of it has been left entirely to the pains, that at the end of many hours, or of two or three days continued labour, the child becomes soft and putrid, and instead of making the evolution described, is thrust down through the pelvis, and into the world doubled, the head lying on the breast or back, and yet the woman has survived.

This, however, is rather to be expected in premature births, that is, when the woman is only advanced five, six, or seven months in pregnancy. At these periods, particularly at the two first, it will generally be right to let the fœtus come into the world in whatever posture it may present; as both the limbs of the fœtus are then too tender to bear any considerable degree of force or extension, and the capacity of the uterus is too straight to admit the introduction of the hand of the operator to turn the fœtus, and deliver it by the feet.

Labours of the third and last class are those which are called *difficult* or *laborious*. These vary much in degree, according as the causes vary. When the difficulty is solely occasioned by a mal-presentation of the head of the child, as when it offers by its face, or by one ear, the head will be frequently forced down in that posture by the pains, and very little more assistance will be necessary than what is given

in natural labours, from which it will only differ by its requiring a greater number of pains, and taking up a longer space of time for its completion. The same will happen when the birth is retarded by a disproportion between the head of the child and the pelvis through which it is to pass; that is, when a woman whose pelvis is small, but perfect in its form, produces a large child, or when the head of the child is more than usually ossified. By the continued force of the pains, the bones of the heads of the generality of children, which do not ordinarily meet, or come in contact with each other, will be pressed together until they ride, or lap one over the other, and sometimes until the head assumes a conical form, the vertex being the apex or point of the cone, and in this state it will come into the world. The midwives are accustomed to call the heads of children that have been so pressed, and altered in their shape, mould-flot heads, or horse-shoe moulds, and are busy, when dressing the children, in forcing the bones back into their places. But this is not necessary, the heads never failing, in time, to assume their proper figure. Children who have been subjected to such a degree of pressure as to occasion an alteration in the shape of the skull, should they be born alive, will generally be found to be so much weakened by the injury they have suffered, as not to be preserved without great care and difficulty.

It has here been supposed, that the expulsion of the head of the child has been left, as in natural labours, to the power of the pains, which will generally be sufficient for the purpose; but this will not happen, in some cases, until, by the long detention of the head of the child in the passage, the soft parts of the woman shall be so bruised and injured, by the pressure they have suffered, that suppuration or mortification of the vagina shall ensue, penetrating into the bladder, or rectum, and sometimes into both, making the vagina the common channel for the urine and the stools. To avoid these distressing accidents, which, when they occur, admit no remedy, or are only in a small degree alleviated by time, various contrivances have been invented to bring away the head of the child, when it is enclavé, or fixed in the pelvis, earlier than it would be forced away by the pains. Those which have been preferred, and which are now almost universally used, are the forceps, the invention of Dr. Hugh Chamberlen, and the lever of Roonhuyzen, (see the articles *FORCEPS* and *LEVER*), the time and manner of using which will now be described.

In all cases requiring the assistance of instruments to complete the delivery, the progress of the labour will be found, from its commencement, to be slower than in those labours which are denominated natural. The observation of this circumstance will induce the practitioner to be careful that the woman be kept cool, and that no efforts be used to accelerate or strengthen the pains; that she be encouraged from time to time to void her urine; that her bowels be kept open by clysters, or by giving her a gently purging medicine, and that ten or twelve drops of the tincture of opium be given at night to procure sleep. By these means, (which must be pursued the second day also if necessary,) her strength will be preserved, and she will be enabled to meet the difficulties she will have to encounter. Before the end of the second day it will generally be found that the os uteri is completely dilated, that the basis, or largest part of the head of the child, has been forced into the brim of the pelvis, that the membranes have burst, and that the greater part of the waters has been discharged. At this period, as if nature was tired with the conflict, the pains usually remit, both in frequency and strength; it now, therefore, becomes necessary to watch over the safety of the woman, and if, at the end of two or

three hours, the head continues still unmoved, to proceed, (having previously informed the woman and her friends of your intention,) to the use of the proper means for expediting the delivery.

*Manner of using the Forceps.*—Having laid the woman on the bed, in the usual position, the accoucheur will sit down behind her, and will introduce two or three fingers of his right hand into the vagina, and continue pushing them gently upwards, until he feels an ear of the child, which will generally be found under, or near, the os pubis; he will then take a blade of the forceps, previously anointed with lard, and introduce it between his fingers, and the head of the child, continuing to push it upwards until it pass over the ear, and so on until the whole of the blade is in the vagina; he will then withdraw his fingers, and raise the handle of the forceps towards the pubes of the woman, while he introduces the second blade in the same cautious manner, directly opposite to the first. He will then bring the handles together, and lock them, and that they may not slip, he will confine the handles together with a handkerchief, or any appropriate ligature. It generally happens, that the force used in applying the forceps gives fresh strength to the pains. During each pain the accoucheur will slowly, and gradually, draw the handles of the forceps downwards, with his right hand, moving them, at the same time, from side to side, keeping his left hand against the perineum of the woman, which he will, through the whole process, carefully guard, to prevent, if possible, its being ruptured, an accident more likely to occur in first, than in subsequent labours. Having in this cautious manner extracted the head of the child, the remainder of the delivery will be conducted as directed under the article LABOUR, *Natural*.

Many practitioners in these cases prefer the use of the lever, which may be considered as a blade of the forceps, and is to be introduced into the vagina between the fingers of the accoucheur and the head of the child, as before directed, and pushed on until it passes over the ear of the child, that lies under or near the pubes of the mother. The accoucheur will then withdraw his fingers from the vagina, and grasping the handle of the lever with his right hand, he will, during every pain, raise it over the pubes, guarding the perineum with his left hand, and continue this movement from time to time, until the head of the child is brought into the world. The plain and simple form of this instrument, and the greater facility with which it is used, have given it a deserved preference over the forceps. For a fuller account of the manner of using the forceps and lever, and for an account of their comparative merit, the reader is referred to Dr. Denman's valuable Introduction to the Practice of Midwifery, and for the history of the invention of the instruments, to Dr. Bland's Account of the Invention and Use of the Lever of Roonhuysen, published in the second volume of Medical Communications, in the year 1790. It is proper to observe, that in all cases in which it becomes necessary to have recourse to the use of instruments to finish the delivery of the child, and, in fact, in all lingering labours, the operator should pay particular attention to the state of the urinary bladder, and if the urine has been suppressed, he must draw it off with a catheter, before he begins to operate.

In the cases that have been described, where the labour has been retarded, and rendered difficult by the causes above enumerated, the methods recommended will generally be found to be competent to bringing it to a conclusion, without occasioning much injury to the mother or to the child. But when the obstacle arises from distortion of the bones of the pelvis of the mother, altering the shape of the pelvis,

and diminishing its capacity, means must then be used to lessen the volume or bulk of the head of the child, otherwise both the mother and child must inevitably perish. The persons in whom this defect in the pelvis is found, are usually short and delicate women, whose growth had been checked in infancy by the rickets, or who had been confined, too rigidly in their youth, to a sedentary posture, in order to acquire a proficiency in music, drawing, or some other accomplishment, and had therefore been prevented taking that portion of exercise in the open air, which is necessary for the growth and strength, as well as for the health of the body.

When called upon to attend a person labouring under this infirmity, the accoucheur will find, on examining, the lower vertebra of the loins, and the upper portion of the sacrum, projecting forward, so as to prevent the head of the child from entering the brim of the pelvis, and the ossa ilia, which form the sides of that cavity, approaching too near to each other, thus frightening the capacity of the pelvis, and changing its form from an oval to a triangular figure. On his discovering this derangement, it will be his duty to inform the friend to the woman of the manner in which he proposes to conduct the labour, and of the necessity he believes there will be of opening the head of the child, in order to preserve the life of the mother. To the perturbed woman he will only say, that the labour will be slow and tedious, that it will be necessary that she avoid all heating drinks, and that she manage her strength and her spirits in the best manner she is able. The bowels must be kept supple and open by clysters, the urine must be drawn off, if suppressed, with the catheter, and an opiate given at night, as in ordinary cases of difficult labour. At the end of the second or third day, according as the pains have been more or less severe, and frequent, the water being nearly all it drained off, and the uterus contracted so as to be in contact with the body of the child, a small portion of the vertex, or presenting part of the head, or perhaps only of the tumid scalp, will be found to be thrust through the brim of the pelvis. As no farther assistance can be expected from the pains, which now would only tend to exhaust the strength of the woman, and to excite such a degree of heat and fever, as might not afterwards be extinguished, it will be necessary to proceed to opening the head of the child, and in that manner complete the delivery. The woman being laid on the bed in the manner before described, and the accoucheur placed behind her, he will introduce two or three fingers of his left hand into the vagina, and pass them upwards until they touch the protruded part of the head of the child, and endeavour to find the fontanelle, or the part where the parietal bones meet; he will then, with his right hand, slide the perforator up into the vagina, which will be guided by his fingers to the place, which it will readily enter, and having, by opening them in various directions, made an aperture into the skull sufficiently large, he will withdraw the perforator, and also the fingers of his left hand, both to give a respite to the woman, and to allow the pains to force a larger portion of the skull, now yielding more easily to the pressure, through the brim of the pelvis. At the end of two or three hours he will re-commence the operation, and will pass his left hand, or as much of it as he can, into the vagina, and introduce one or two of his fingers into the aperture of the skull of the child; this will serve as a guide to the crotchet, which he will now use. Having further broken the texture of the brain with the crotchet, he will move it about within the cranium, until he finds it firmly fixed, when he will begin to draw downwards, and continue this action at intervals, until he finds he has brought the whole of the head of the child into the vagina. It is useful

to keep the left hand, or two or three fingers of it, in the passage, that if the crotchet should slip, they may prevent any injury being done to the vagina. Having paused again, for the space of an hour, to give the uterus opportunity of contracting, he will easily bring the head of the child, now emptied of its contents, into the world, and the remainder of the labour will be conducted as in ordinary cases.

In labours of this class, that is, in difficult labours, as the progress of them is always slow, giving opportunity to the uterus to contract, the expulsion of the placenta is usually performed sooner, and more easily, than in natural labours.

**LABOURED ACCOMPANIMENT.** See ACCOMPANIMENT.

**LABOURER,** in *Agriculture*, a person who performs the manual or most laborious part of the business of a farm. Labourers are mostly such persons as live in cottages, or small houses in the vicinity of the farms, or in the houses of the farmers themselves.

The author of *Modern Agriculture*, after premising that in all civilized states, the great body of the people live by labour; and that, of whatever nature it may be, the wages received must be more than sufficient to maintain the labourer, as, were it otherwise, he could not bring up his family, and consequently this class of men would soon become extinct; observes, that in every county or district, where the useful arts are in a flourishing state, and where those employed in carrying them on are most successful in accumulating riches, the rate of wages, or price of labour, is highest. Luxury is a never-failing attendant on riches, and the number of servants always increases with the means of maintaining them. Therefore an increasing demand for servants or labourers, whether for carrying on agriculture, the purposes of trade, or for administering to the artificial wants created by luxury, naturally tends to advance the price of labour. The very great recent advance in the rate of wages in some counties in Scotland, as Lanark, Renfrew, Perth, Angus, Fife, &c. amounts, it is supposed, to the most positive evidence, that commerce, manufactures, and improvements in agriculture have rapidly increased. The still low price of labour in the counties of Caermarthen, Pembroke, Cardigan, &c. in Wales; and Nairn, Inverness, and the other northern counties of Scotland, notwithstanding the great emigrations of labourers to those parts of the island, where they are more certain of finding employment, is a sure sign that in these remote districts the arts have scarcely ever been introduced. It shews also, that little attention is bestowed by the proprietors to improve the situation of the peasantry, either by inuring them to habits of industry, or instructing them in the advantages to be derived from a proper division of labour. In those counties where the arts have been introduced, and where the rate of labour has continued for a number of years nearly the same, it will be found that agriculture, commerce, and manufactures, although perhaps formerly in a prosperous state, are at present stationary, and that a national exertion is necessary, in order to set them again in motion.

And further, that the wages of farm-servants, and of labourers, who are occasionally engaged in the operations of husbandry, vary nearly as much in the different districts of Great Britain, as they do in the several kingdoms of Europe. In the counties in England, where commerce and manufactures are carried on to the greatest extent, as Middlesex, Surrey, Kent, Lancaster, Cheshire, the well-riding of Yorkshire, &c. the wages of farm-servants and day labourers may, it is conceived, be stated as follows:

	Average.
	<i>£. s. d.</i>
A ploughman by the year, from 9 <i>l.</i> to 15 <i>l.</i> -	12 0 0
A female servant, do. from 4 <i>l.</i> to 6 <i>l.</i> -	5 0 0
A labourer in the summer, from 1 <i>s.</i> 6 <i>d.</i> to 2 <i>s.</i> -	0 1 9
A labourer in winter, without board, from 1 <i>s.</i> to 1 <i>s.</i> 2 <i>d.</i> -	0 1 1
A mason ditto, from 1 <i>s.</i> 10 <i>d.</i> to 2 <i>s.</i> 2 <i>d.</i> -	0 2 0
A carpenter ditto, from 1 <i>s.</i> 8 <i>d.</i> to 2 <i>s.</i> 4 <i>d.</i> -	0 2 0

Where agriculture is the chief employment of the people, as in Hertford, Buckingham, Rutland, Northampton, Worcester, Northumberland, &c.

	Average.
	<i>£. s. d.</i>
A ploughman's wages may be stated from 7 <i>l.</i> to 12 <i>l.</i> -	9 0 0
A female servant, from 3 <i>l.</i> 10 <i>s.</i> to 5 <i>l.</i> -	4 5 0
A labourer in summer, without board, from 1 <i>s.</i> 4 <i>d.</i> to 1 <i>s.</i> 8 <i>d.</i> -	0 1 6
Ditto in winter, ditto, from 1 <i>s.</i> to 1 <i>s.</i> 2 <i>d.</i> -	0 1 1
A mason, ditto, from 1 <i>s.</i> 10 <i>d.</i> to 2 <i>s.</i> 2 <i>d.</i> -	0 2 0
A carpenter, ditto, from 1 <i>s.</i> 8 <i>d.</i> to 2 <i>s.</i> 4 <i>d.</i> -	0 2 0

In those counties in Wales, where improved modes of husbandry are little practised, and where there are scarcely any commerce or manufactures,

	Average.
	<i>£. s. d.</i>
A ploughman's wages are from 4 <i>l.</i> 10 <i>s.</i> to 7 <i>l.</i> -	5 15 0
A female servant, from 2 <i>l.</i> 10 <i>s.</i> to 4 <i>l.</i> 4 <i>s.</i> -	3 7 0
A day-labourer in summer, without board, from 8 <i>d.</i> to 1 <i>s.</i> -	0 0 10
Ditto, in winter ditto, from 6 <i>d.</i> to 8 <i>d.</i> -	0 0 7
A mason, ditto, from 1 <i>s.</i> 6 <i>d.</i> to 2 <i>s.</i> -	0 1 9
A carpenter, ditto, from 1 <i>s.</i> 4 <i>d.</i> to 1 <i>s.</i> 8 <i>d.</i> -	0 1 6

It has been observed, that the rate of wages has advanced very rapidly of late years, in many counties in Scotland. In that part of the kingdom south of the Grampian mountains, the rise in the price of labour has, he says, been general, and is now nearly double what it was twenty years ago.

	Average.
	<i>£. s. d.</i>
A ploughman's wages is from 7 <i>l.</i> to 12 <i>l.</i> -	9 10 0
A female servant, from 3 <i>l.</i> to 4 <i>l.</i> 10 <i>s.</i> -	3 15 0
A day labourer, in summer, without board, from 1 <i>s.</i> 2 <i>d.</i> to 1 <i>s.</i> 6 <i>d.</i> -	0 1 4
Ditto in winter, ditto, from 10 <i>d.</i> to 1 <i>s.</i> 2 <i>d.</i> -	0 1 0
A mason, ditto, from 1 <i>s.</i> 6 <i>d.</i> to 2 <i>s.</i> 4 <i>d.</i> -	0 1 11
A carpenter, ditto, from 1 <i>s.</i> 4 <i>d.</i> to 2 <i>s.</i> -	0 1 8

In the northern divisions of the kingdom, where there is little commerce or manufactures, and where improvements in agriculture are only partially introduced,

	Average.
	<i>£. s. d.</i>
A ploughman receives from 3 <i>l.</i> to 6 <i>l.</i> -	4 10 0
A female servant, from 2 <i>l.</i> 2 <i>s.</i> to 3 <i>l.</i> 14 <i>s.</i> -	2 18 0
A day labourer, in summer, without board, from 8 <i>d.</i> to 1 <i>s.</i> -	0 0 10
Ditto, in winter, ditto, from 6 <i>d.</i> to 8 <i>d.</i> -	0 0 7
A mason, ditto, from 1 <i>s.</i> to 1 <i>s.</i> 6 <i>d.</i> -	0 1 3
A carpenter, ditto, from 1 <i>s.</i> to 1 <i>s.</i> 4 <i>d.</i> -	0 1 2

From the above averages, the following table, which may be considered as containing pretty nearly, he says, the medium rate of agricultural labour in these kingdoms, at the present period, is formed:

# LABOURER.

General Average.

	£.	s.	d.
A ploughman - - - -	7	3	6
A female servant - - -	3	7	0
A day labourer, in summer, without board	0	1	3
Ditto, in winter, ditto - - - -	0	0	11
A mason, ditto - - - -	0	1	10
A carpenter, ditto - - - -	0	1	8

In the above statements, the difference in the rate of wages does not, it is supposed, appear so considerable (except in Wales, and the north of Scotland, compared with the better cultivated parts of Great Britain), as, had it been possible to ascertain the price of labour in each particular county, would have been evident; local circumstances frequently operating to augment or depress the rate of wages in particular districts, which is not discernible when numbers are classed together.

But the rates of wages, or prices of labour, have increased in the proportion of, from a quarter to a half, since the period in which the above was written, which is only a very few years. These are, he conceives, affected by some or all of the following causes, *viz.* 1<sup>st</sup>. The increase of commerce and manufactures: 2<sup>dy</sup>. The depreciation in the value of money, and its present nominal value, compared with the price of the ordinary articles of provisions: 3<sup>dy</sup>. The general introduction of improvements, and of new modes of cultivation; whereby, although fewer hands are necessary, those possessing superior skill become more in request: 4<sup>thly</sup>. The ease or difficulty of finding constant or regular employment: and, 5<sup>thly</sup>. The mode in which a farm-servant, or labourer, maintains his family.

With respect to the first, it is supposed, that the increase of commerce and manufactures of the towns has contributed to the improvement of the country, as well by affording a ready market for the produce of the soil, as by various other means, will not be denied; but that the rapid increase of them within these few years has had a great effect in raising the price of labour is equally evident. The great numbers of people crowded together in large cities and manufacturing towns, are not only against the increase of population, but also against longevity. There are besides several sorts of manufactures, which are well known to be destructive of the human constitution; not to mention the many accidents to which those employed in the various branches of commerce and manufactures are exposed, tending to shorten life, and from which those engaged in the operations of husbandry are exempted. For these reasons, there is a constant demand for people from the country, in order to keep up the population, and to carry on the commerce and manufactures of the towns. The great additional price commonly paid for commercial and manufacturing, beyond that for agricultural labour (except where the influence of the former affects the latter), and the habits of luxury, in which the labouring part of the community live in towns, compared with the generality of their neighbours of the same class in the country (particularly in Scotland), are strong inducements, it is contended, with many of the peasantry, either to remove to the towns, or send their children thither: while others, in consequence of the too general practice of adding farm to farm, and demolishing cottages, are forced to seek that asylum in towns which is refused them in the country. The demand for labourers from the towns being complied with, the country is thereby drained of useful hands, and the price of agricultural labour advanced. This must necessarily happen, it is thought, in every kingdom during the period that its commerce and

manufactures are on the increase; and more especially in those nations where the legislature turns its attention to support commerce and manufactures at the expence of agriculture.

The second, the depreciation in the value of money, is also another and substantial reason for the apparent rise in the price of labour. The increase of commerce and manufactures, which has been gradually taking place in this island ever since the beginning of the reign of queen Elizabeth, and the immense additions which have been made almost every year to the national debt within the present century, seem to have rendered it necessary to increase, nominally, by means of bank-notes, promissory-notes, bills, &c. the quantity of money in circulation. That these substitutes for specie have had the effect to reduce the value of money is an obvious fact. If, therefore, the value of money has fallen, the labourer of the present day requires of course a greater quantity to carry to market than his predecessors, to purchase even such articles as are consumed in the particular district where he resides (whether right or wrong), as indispensably necessary for the maintenance of a peasant's family. Whether the Middlesex labourer goes to market to purchase beef or mutton, or the Aberdeenshire cottager oatmeal, it will, it is conceived, be found that nearly double the sum is required to purchase the same quantity now that it did thirty years ago.

After this, some facts are stated in order to shew that, however much the nominal price of labour has increased, its real price, compared with that quantity of provisions it will purchase, remains all over the island nearly the same, except only where a variety of circumstances combine; such as contiguity to large towns, or extensive manufactories and public works; and the want of due attention to the providing of work, from improved modes of husbandry, not being introduced to raise or depress it beyond its ordinary level.

In regard to the third, it is observed, that besides forming canals and turnpike-roads, which may be considered equally beneficial to the interests of commerce and manufactures as to those of agriculture, there have been many improvements introduced in husbandry, which, while they have contributed to advance alike the prosperity of the nation, the proprietors and farmers have also been the means of bringing about a considerable alteration in the situation of the inhabitants at large, as well as in the price of labour. The immense number of people necessary for carrying on the various operations of inclosing, draining, planting, erecting farm-buildings, digging marle, quarrying and burning lime-stone, hoeing potatoes, turnips, and other green crops, must first have had the effect of giving full employment to the people in those districts where such improvements were introduced, and gradually to advance the rate of wages, in consequence of the increased demand for labourers. The general introduction of new modes of cultivation, whereby, although fewer people are necessary, those possessing superior skill become more in request, is another reason of the advance in the wages of the farm-servants. This observation will be considered as well founded by all those who recollect the period, when ploughing with a man and two horses, without a driver, became common in Scotland. The number of horses or oxen formerly worked in the plough varied in some cases, according to the nature of the soil; but was more frequently regulated either by the custom of the district, or the fancy of the farmer. When, in consequence of the spirited exertions of some individuals in several counties, the practice of ploughing with two horses was pretty generally introduced, the farmers found themselves thereby

relieved of a very great share of the annual expence of cultivation; but as it was then considered a very arduous undertaking to manage a two-horse plough, every farmer selected the best ploughman he could find; and these becoming thereby in request, it was no difficult matter for them to bargain for an augmentation of wages, which the farmers of that period could very well afford, and which many now living will not hesitate to acknowledge they granted on principles of economy.

In respect to the fourth, it is suggested, that the ease or difficulty which labourers frequently have in finding constant and regular employment; or, in other words, when labourers are only partially employed, the rate of wages must be affected by that circumstance. It has already been observed, that those who live by labour must receive such a compensation as is more than sufficient for their subsistence. When a labourer has constant employment, whatever be the rate of wages, as it must be equal to the price of the ordinary articles of provisions in whatever part of the island he is situated, his incomings and outgoings will be nearly the same. Hence it follows, that when, from the difficulty of finding employment, he can only procure work for three, four, or five days in the week, he must receive the same sum for the three, four, or five days that in the other cases he would do for the labour of six; otherwise his incomings must be less than he is necessarily called to expend. When that happens, labourers are often obliged to remove occasionally to another quarter, or betake themselves to some mechanical employment; and in either case, their services are lost to the farming part of the community where they resided. The want of constant employment, therefore, it is conceived, operates in two ways to raise the price of labour; first, by the necessity the labourer is under while he continues in that capacity of demanding as much for the work of three, four, or five days, as is fully equal to his subsistence for a week; and secondly, many of them being obliged to betake themselves to other means for providing for themselves and families, the number of labourers becomes greatly diminished, and the remainder of course more in request.

And on the last point, it is supposed that the various modes in which farm-servants and labourers maintain their families must necessarily have a very great influence on the expence of agricultural labour in different parts of the island. In a great part of England, butcher's-meat, dumplings or puddings, bread made of fine flour, with beer, ale, and very commonly tea, are reckoned indispensable articles of cottage house-keeping; while in Scotland, oatmeal, cooked in various ways, vegetables, and now and then a little butcher's-meat, are the chief articles which constitute the food of the people employed in husbandry, even in the best cultivated parts of the kingdom. This essential difference in the mode of living must, it is conceived, be a great additional expence in the article of labour to the English farmer beyond what those in Scotland are subject to, and might induce such as are not acquainted with the various circumstances connected with the husbandry of both kingdoms, to give a decided preference in favour of Scotland. It should, however, be remembered, that this kind of additional tax paid by the English farmer more properly affects the landlord, and is one of the principal reasons why lands in England are rented lower than those of the same quality in Scotland; it being an indisputable fact, and which, in Scotland, daily experience proves well-founded, that a great proportion of what the farmers save in the article of labour, or by the introduction of more improved and less expensive cultivation, sooner or later finds its way into the landlord's pocket.

And a very respectable author, Dr. Smith, in his work on the Nature and Causes of the Wealth of Nations, vol. i. has observed, that "the difference in the mode of labourers' subsistence is not the cause, but the effect, of the difference in their wages; although, by a strange misapprehension, I have frequently heard it represented as the cause." It is farther added, that "it is not because one man keeps a coach while his neighbour walks a-foot, that the one is rich and the other poor; but because the one is rich he keeps a coach, and because the other is poor he walks a-foot."

The author of *Modern Agriculture* thinks it will be admitted, that at the period when a general alteration has taken place for the better in the established mode in which labourers maintain their families (as in the south of Scotland, where the price of labour has nearly doubled within these twenty years), the expence at which a cottager's family is maintained has advanced in the same proportion. They eat better food, wear more expensive clothes, and live in more comfortable dwellings,—all which, he says, no doubt, as Dr. Smith observes, is the effect, not the cause, of the recent increase in the price of labour.

But that in England, where the mode of maintaining a labourer's family has undergone little alteration for ages, it is presumed, that although the difference in the modes of living was, at first, the effect naturally to be expected from a rise in the price of labour, yet it is now one cause why the rate of wages continues in that kingdom to advance. Those articles which with that class were once deemed the luxuries, are now considered only as the bare necessaries of life, and the prices have advanced in nearly the same proportion as their wages. For instance, those who in that country require labourers, must either pay them such an advance of wages as will enable them to subsist according to the general mode established in the country, whatever the additional price of the ordinary articles of provision may be, or compel them to make use of more simple and less expensive kinds of food, which were used by that class of men a century or two ago. As every person who stands in need of labourers, will adopt the first of these alternatives, it follows of course that the difference which has long taken place in the mode of maintaining a labourer's family in England, compared to that of ancient times, is now one cause for the advance in the rate of wages.

It is stated, that it has now become a general complaint among proprietors, merchants, manufacturers, and farmers, that the price of labour is become too high. That, owing to one or all of the causes before-mentioned, it has advanced in many districts to a degree unknown in any former period of the history of these kingdoms, is a fact well known. Those who regret that the price of labour is advanced, (provided it is kept within proper bounds, and does not arise from a national neglect of the situation of the peasantry,) ought to comfort themselves with the reflection, that this never happens in any state which is not increasing in wealth and prosperity. It is owing to that cause, and to no other, that the working-people in any nation are more liberally rewarded for their labour; and in place of regret it ought to give pleasure to every friend to his country, that the great body of the community are enabled, from the fruits of their honest labours, to procure themselves a greater share of the comforts of life. At the same time, let it be observed, that those who have occasion to employ labourers pay attention to the advice of the author of the *Scafons*.

"Be mindful of the rough, laborious hind  
That sinks you soft in elegance and ease."

They should also consider, that there are bounds beyond which they ought not, in prudence, to pass.

But the mode of maintaining farm-servants in many places of England is both absurd, and, it is conceived, expensive in the extreme, and calls as loudly for reform as any error in the whole range of British husbandry. In Northamptonshire, the breakfast consists of cold meat, with cheese, bread, and beer; for dinner, roasted or boiled meat, with pudding; and for supper, the same as at breakfast; and besides ale, which is allowed on extraordinary occasions, they have small beer at command all hours. And in the Rural Economy of the Midland Counties, after noticing that the beer and ale are brewed unreasonably strong, and that the quantity allowed to a man is unnecessarily great, it is stated, that, in hay and corn harvest, the customary allowance is a gallon (upwards of five bottles) of beer a man per day; and that, during winter, the quantity of small beer used is not much less than in harvest. And it is farther noticed, that the increased expence in the mode of maintaining farm-servants, as now too generally practised in England, is attributed to the following causes. Some few farmers in every county, either from a mistaken idea, that the better their servants are fed the more work they will perform, or from pride, and from a desire to gain popularity among that class of people, lead the way, while their more sensible neighbours, and even those whose situations in life but ill accord with such additional expence, are forced to follow the example, by which means extravagance in the maintenance of servants has arrived at its present height, and seems to be daily gaining ground.

It is suggested, that the wages paid for agricultural labour, either to servants by the year, or to labourers by the day, throughout the better cultivated parts of Great Britain, although considerably different, are, nevertheless, much less than might have been expected, and appear by no means sufficient to counterbalance the advantages which are derived from superior climate, and more favourable situations in regard to markets. The expensive manner in which the farm-servants are maintained in the greatest part of England, when compared with that of the more improved parts of Scotland, creates a much greater addition to the expence of cultivation in the former kingdom, than that arising from the difference in the money-price of labour. In forming a just estimate of the difference which takes place in the expence of cultivation, in particular districts, beyond that in others, it is necessary, it is said, to consider not only the sum of money paid as wages, and the expence of maintaining servants, but also the quantity of work performed, and the number of men and horses which, according to the practice of particular districts, are considered as necessary to cultivate the same quantity of land. The following statement will shew at one view the difference of keeping a team by the year, and of ploughing an acre of land, in Gloucestershire, in England, where five horses are commonly used; and in the county of Angus, in Scotland, where only two are considered necessary.

The County of Angus.

	£.	s.	d.
Ploughman's wages	10	0	0
Board, generally under	8	0	0
Maintenance of two horses at 15 <i>l.</i> each	30	0	0
Tear and wear of ditto, and accidents, 2 <i>l.</i> each <i>per annum</i>	4	0	0
	<hr/>		
	52	0	0
	<hr/>		

Gloucestershire.

	£.	s.	d.
Ploughman's wages	10	0	0
Board, 6 <i>s.</i> per week	15	12	0
Boy's wages	5	0	0
Board, 4 <i>s.</i> per week	10	8	0
Maintenance of five horses at 15 <i>l.</i> each	75	0	0
Tear and wear of ditto, and accidents, 2 <i>l.</i> each <i>per annum</i>	10	0	0
	<hr/>		
Annual expence of Angus farmer	52	0	0
	<hr/>		
Yearly difference against Gloucestershire farmer	74	0	0

It is stated, that if these men and horses were employed in ploughing the whole year, and that they ploughed an acre a-day, they would each have ploughed 313 acres in the course of the year. The expence to the Gloucestershire farmer would be 8*s.* each acre, while the Angus farmer would have the same extent of labour performed at about 3*s.* 4*d.* per acre. There is also a great a difference in the expence of thrashing grain. Since the introduction of thrashing-machines in Scotland, the grain can be separated from the straw upwards of 50 per cent. cheaper, and to better purpose, than is to be done in England by manual labour. This comparison might be made to include other operations, which are more or less expensive to perform, in consequence of the peculiar customs and practices of particular districts. But all that is proposed here is to give an idea of the proper mode of calculating the expence of agricultural labour, and an instance or two of the saving which every farmer has in his power to make, by using well-constructed implements of husbandry, and performing the various operations with as few men and horses as possible.

It is added, that the scarcity of farm-servants and day-labourers has of late been considerably felt in many parts of Great Britain, and seems to be gradually increasing. The principal causes to which this evil is to be ascribed are, in the opinion of the above writer, the inclosure bills in England, the enlarging or engrossing farms in both kingdoms, and the general increase of commerce and manufactures. But a more serious and certain cause of this evil is probably to be found in the constant state of warfare in which this country has been engaged for almost the whole of the last half century. The deficiency of labourers is an evil so serious a nature, (from whatever cause it has originated,) as ought to induce proprietors and farmers of all descriptions to adopt such measures as appear most proper for insuring a future and more abundant supply. That which seems the most likely to effect this desirable object with the greatest certainty is the building of cottages on every farm, in numbers proportioned to the extent of hands necessary for its cultivation. Experience has proved that cottages are the best nurseries for useful farm-servants and labourers; and while nothing would tend so speedily or so effectually to supply this defect as affording the labouring class of the people the means of living comfortably in the country, it would also be the means, in a great degree, of silencing the rising clamour against enlarging or engrossing farms. In this view it is suggested, that a tax on every proprietor and farmer in Great Britain, who had not as many cottages erected and inhabited, in a limited time, as there were ploughmen required for the cultivation of the farm; or one cottage for every certain number of acres. Such a tax, if imposed for the express purpose of increasing the population

of the country, and thereby keeping the price of all kinds of labour moderate, could not fail in time, it is supposed, to have the wished-for effect.

However, it is observed also, that the practice of joining two or three, sometimes half a dozen, small farms in one, and the consequent demolition of the cottages, has had the effect of bringing about a great alteration, in many counties, in the description of servants employed in husbandry: as, instead of employing married men living in cottages contiguous to the farm, and paying them partly in necessaries of life, young men, brought up in towns or villages, are employed, and their wages paid wholly in money,—from which many bad consequences proceed. From the advantages to be derived by employing married men, who have families residing on some detached part of the farm, as ploughmen, as well as from the acknowledged scarcity of labourers, may, it is supposed, be inferred the propriety and even necessity of improving, by every proper means, the situation of the peasantry. The labourer's situation would be much improved, were his employers to revert to the old practice of paying him a great part of his wages in the necessary articles of provisions: he would then be prevented from the necessity of having recourse, for every article he requires, to those worse than pawn-brokers, the keepers of little paltry chandler's shops; a set of people who, without remorse, appropriate to themselves, under the name of a reasonable profit, a great proportion of the hard-earned wages of the laborious peasant. And next to getting the great article of provisions on reasonable terms, the allowing every cottager the means of keeping a cow, and of planting a reasonable quantity of potatoes and other vegetables, would tend, more than any other circumstance, in the writer's opinion, to his happiness and comfort; as it would enable him to procure a considerable share of the sustenance of his family, without the expenditure of money, or the risk of imposition. It would also, it is imagined, be a great spring to the industry of the labourer, to let him all his labour by the great, or piece. He would be induced to labour with more steadfastness and perseverance, when he was satisfied that it was in his power to apply the fruits of his extraordinary exertions to the benefit of his family. And, lastly, to encourage, by every proper means, the establishment of friendly societies among the labouring class of people, as a means of provision against accidents, sickness, and old age.

Farm labourers, Mr. Marshall thinks, as being the most valuable class of men that a populous country possesses, should have every comfort provided for them that is compatible with their situation, and conformable to the general interest of the community:—that their wages ought to be every where, and at all times, sufficient for the maintenance of themselves and families while in health, with a surplus to provide against the day of sickness, without their being under the degrading necessity of making application to their neighbours for relief. Persons so essentially useful to society should not merely support existence, but have the comforts of wholesome habitations, with sufficient spaces of ground to furnish them and their families with changes of proper vegetable food, without much expence. It is, after all, this class of men that constitutes the great basis or prop of a country.

Labourers conspiring together concerning their work or wages, shall forfeit 10*l.* for the first offence, 2*cl.* for the second, &c. and if not paid, to be set on the pillory. (Stat. 2 & 3 Edw. VI. cap. 15.) Justices of peace, and stewards of leets, &c. have power to hear and determine complaints relating to non-payment of labourers' wages. (4 Edw. IV. cap. 1. 22 Geo. II. c. 19. 31 Geo. II. c. 11.)

And labourers taking work by the great, and leaving the same unfinished, unless for non-payment of wages, or when they are employed in the king's service, &c. are to suffer one month's imprisonment, and forfeit 5*l.* The wages of labourers are to be yearly assessed for every county, by the sheriff and justices of peace, in the Easter sessions; and in corporations by the head officers, under penalties. (5 Eliz. cap. 4.) And the sheriff is to cause the said rates and assessments of wages to be proclaimed. (1 Jac. I. cap. 6.) All persons fit for labour shall be compelled to serve by the day, in the time of hay or corn harvest; and labourers in harvest time may go to other counties, having testimonials. From the middle of March to the middle of September, labourers are to work from five o'clock in the morning till seven or eight at night, being allowed two hours for breakfast and dinner, and half an hour for sleeping in the three hot months; and all the rest of the year from twilight to twilight, excepting an hour and a half for breakfast and dinner, on pain of forfeiting one penny for every hour's absence. (5 Eliz. c. 4.) By stat. 6 Geo. III. c. 25. artificers, labourers, and other persons, absenting themselves from the service of their employers, before the expiration of the term contracted for, shall be punished by imprisonment, for not less than one month, nor more than three. If any labourer shall make an assault upon his master, he shall suffer as a servant making such assault. (5 Eliz. c. 4.) See MANUFACTURERS and SERVANTS.

LABOUREUR, JOHN LE, in *Biography*, was born, in 1623, at Montmorenci, near Paris. At the age of nineteen he displayed a turn for historical researches by publishing "An Account of the Tombs in the Church of the Celestines at Paris, with brief Memoirs of the Persons entombed;" which was very well received. In 1644, he was at court, in the character of gentleman in waiting, when he was sent into Poland, with the marshalls of Guebriant, on a mission to Ladislaus IV. to whom the duchess of Nevers was contracted. After his return he published a narrative of this embassy. He next entered into the ecclesiastical profession, and was made almoner to the king, and prior of Juvigné, and in 1664 he was created commander of the order of St. Michael, and appointed almoner to the king. He wrote the "History of the Marshal de Guebriant;" and he was editor of a new impression of the "Memoirs of Michael de Castellnau," with several genealogical histories, in three vols. folio, 1731: this performance is reckoned to throw much light upon several parts of French history; "History of King Charles VI. translated from the Latin of a MS. in the Library of de Thou," two vols. folio; "A Treatise on the Origin of Coats of Arms." He left many MSS. among which is "A History of the Peerage." Moreri.

LABOURSOME, among *Seamen*, implies a violent rolling or pitching motion of a ship at sea, by which the masts and even the hull are in great danger. By pitching suddenly the masts are likely to be carried away, and by the heavy rolling motion the masts strain upon the shrouds, and, consequently, upon the sides, with an effort which increases as the sine of their obliquity, and the continued agitation of the vessel gradually loosens her joints, and makes her extremely leaky.

LABRADOR, in *Geography*, an extensive country of North America, so called by the Portuguese, who first discovered its coast, comprehended in New Britain. It is bounded on the N. by Hudson's strait, on the S. by part of Lower Canada and the river St. Lawrence, on the W. by Hudson's bay, on the N. E. by the ocean and Davis's straits, and on the E. by the straits of Bellisle and the gulf

of St. Lawrence. The extent of this country has been but imperfectly ascertained: for our knowledge of the eastern coast and of its inhabitants, we are chiefly indebted to lieutenant Roger Curtis, from whose papers extracts were made and communicated to the Royal Society, in 1774, by the honourable Daines Barrington (Phil. Transf. vol. 64, part 2.) and to Mr. Cartwright, who resided, at different intervals, for sixteen years, in this desolate country, and whose account of it was published at Newark in 1792. But the knowledge thus obtained principally relates to the coast; for the inland territory remains still unexplored. These writers concur in representing the face of the country, as far as they could discover it, not only hilly, but mountainous; some of the mountains being of a considerable elevation. From the sea the fourth coast seemed to be fertile and to be covered with a degree of verdure; but the soil, on examination, was poor, and the verdure was that of coarse plants, which might serve for deer and goats, but was not proper for horses, kine, or sheep. To the improvement even of this part, the depredations of the bears and wolves furnish a formidable impediment; and the cattle, on account of the severity of the climate, must be housed for nine months in the year. The whole of the east coast exhibits a very barren appearance: the mountains rising suddenly out of the sea and being composed of rocks, which are thinly covered with black peat earth, that produce stunted spruces and a few other plants. The adjacent sea, however, the rivers and lakes, which are numerous, abound with fish, fowl, and amphibious animals. Springs are rare, and the water is chiefly supplied by melted snow; nevertheless, it is wholesome, and those swelled throats which frequently occur in the Alpine regions of Europe and Asia, are unknown in this country. On the coast are several spacious and safe harbours; and at a small distance, and within its capacious bays, there are thousands of islands of different sizes, on which eider-ducks breed in large flocks, and which are stocked with a multitude of sea-fowl. On some of the larger isles there are deer, foxes, and hares. All kinds of fish, belonging to the Arctic seas, abound on this coast; and the rivers are frequented by salmon and sea-trout, pike, barbel, river-trout, eels, and other kinds. At a small distance from the coast in the inland territory, the air is milder; the soil is more fertile, and trees, some of which are of a large size, are more numerous. The ground is covered with spruces and firs, with an intermixture of larches, birch, and aspens, particularly near the shores of the bays, rivers, brooks, and ponds, where alone they arrive at any degree of perfection. Other trees are mere shrubs, and they are the alder, osier, dog-berry, pears, currants, raspberries, and a few others. The fruits consist of various kinds of berries, viz. currants, raspberries, partridge-berries, cranberries, apples, pears, whortle-berries, and a small berry, the plant of which resembles the strawberry, each producing only a single fruit, of a bright pink colour, granulated like a mulberry, and having a delicate flavour. The vegetables fit for food are wild celery, scurvy grass, the young leaves of the osier and of the ground whortle-berry, Indian fallad, red docks, and an Alpine plant, of which the rein-deer are very fond. The soil, though of a light kind, is not destitute of clay; no ores, except those of iron, have been discovered; but they are plentiful. White spar is common, and several samples of that called Labrador spar, have been picked up by the Esquimaux. The birds of the country are the white-tailed eagle, falcons, hawks, and owls of various kinds, the raven, white grouse, ptarmigan, spruce game, whistling curlew, grey plover, various species of sandpiper, and other

waders, geese, ducks of various sorts, flags, gulls, divers, swallows, martins, some few species of small birds, snipes and doves, the two last being very scarce. The beasts are white and black bears, rein-deer, wolves, wolverines, various species of foxes, martens, lynxes, otters, mink, beavers, musquash, raccoons, hares, rabbits, and moles, and probably other kinds. The climate, though severe, is salubrious; there is little appearance of summer till about the middle of July; and in September winter indicates its approach, so that this latter season is long and the cold is severe. In summer the heat is sometimes unpleasant, and in that season the weather is very moderate, and remarkably serene, without those fogs which are more prevalent in Newfoundland, and those violent gales of wind, to which some other parts of the globe are subject. At this season, the mosquitoes and sand-flies, which are very numerous, are intolerably troublesome. The winters are said to be less severe than formerly. The greatest heat observed at Nain (N. lat. 57°) in the year 1780, was 84°, and this was in July; the greatest cold in 1779 was - 30°. On the sea-coast it is much cooler than farther inland, more especially when the wind blows from the ocean, on account of the immense quantities of ice that are contiguous to the coast; and which, together with the islands already mentioned, render the navigation dangerous. These shoals of ice set in from the north in spring and summer. It is not an unknown phenomenon in these northern and colder climates, that several beasts, and some of the birds, change their colour with the seasons. In the winter, the prevalent colour is white; and against the rigour of the cold, most animals are furnished by the order of providence with a defence. The quadrupeds are clothed with a longer thicker hair, or fur; and the birds have a softer down and feathers of a closer texture than those of milder countries.

On the coast of this desolate country there were only a few factories, till the Moravian clergy formed small settlements, particularly at Nain, about the year 1764. Upon barren rocks, covered with snow for more than half the year, and where the winters are so rigorous, and of such long continuance, we cannot expect to find that the inhabitants are very numerous. The native inhabitants of this country are mountaineers and Esquimaux, between whom there subsists an invincible aversion. The mountaineers inhabit the interior parts of the country, towards the north, and with respect to colour resemble our gypsies, which is probably acquired by their being exposed to the weather, and to the smoke of their wigwams. They are of a robust constitution, though their limbs are small, and their frame is well adapted to the rocky country, which they are continually traversing. They have no hair except on the head; and for many years they have dressed their food, which they boil to a jelly, whereas the other Indians eat every thing raw. They chiefly subsist on rein-deer, which they are very dextrous in killing. They also kill foxes, martens, and beavers. As they have a wandering kind of life, they never build houses; but they construct a kind of tents, covered with deer-skins and birch, and called wigwams; the skins which they use for this purpose, as well as for clothes, are tanned in order to take off the hair, then washed in a lather of brains and water, and afterwards well dried and well rubbed; but for winter use they have jackets of beaver, or deer-skins, with the hair on. They traverse the country by the assistance of canoes in the summer; and of rackets, or snow-shoes, in the winter. Their canoes are covered with the rind of birch; and though they are so light as to be easily carried, they are large enough to contain a whole family, and the materials of their traffic.

traffic. By means of the numerous ponds which are found in this country, they thus convey themselves to a great distance in a short time; travelling by water or by land, as circumstances require. They bear fatigue with incredible resolution and patience; and will travel two days successively, without taking any sort of nourishment. They are esteemed an industrious tribe; and for many years they had been known to the French traders. Their chief employment is to procure fur, and the necessaries of life; they are very illiterate, but generally good-natured, and said to be less ferocious than other Indians; and this softness of manners they have probably acquired by their long intercourse with Europeans. They come every year to trade with the Canada merchants, who have seal fisheries on the southern part of the coast, and they bear the character of just dealers, says Curtis, though Cartwright charges them with a proneness to theft. They are, without doubt, immoderately fond of spirits, for which, blanketing, fire-arms, and ammunition, they truck the greatest part of their furs. With regard to religion, they profess themselves Roman Catholics; but know no more of it than merely to repeat a prayer or two, count their beads, and see a priest whenever they go to Quebec. It is their custom, says Curtis, to destroy the aged and decrepid, when they become useless to the society, and burthenome to themselves. This practice they vindicate from their mode of life; alleging that those who are unable to procure necessaries, should not live merely to consume them.

The *Esquimaux* (see that article) who inhabit the northern part of Labrador, are indistinctly Greenlanders. They are of a deep-tawny, or rather copper-coloured complexion; they are inferior in size to the generality of Europeans, and there are but few of them who are of a good stature. They are flat-visaged, and have short noses; their hair is black and very coarse; their hands and feet are remarkably small. The women load their heads with large strings of beads, which they fasten to their hair above their ears; and they are fond of a hoop of bright brass, which they wear as a coronet. Their dress is entirely of skins; and consists of a sort of hooded close shirt, breeches, stockings, and boots. The dress of the different sexes is the same, except that the women wear very large boots, and their upper garment is ornamented with a tail. In the boots they occasionally place their children; but the youngest is always carried at their back, in the hood of their jacket. They have no sort of bread, but live chiefly on the flesh of seal, deer, fish, and birds. In the winter they live in houses, or rather caverns, which are sunk in the earth. In the summer they occupy tents, made circular with poles, and covered with skins. They have no sort of beverage among them except water, and are not fond of spirituous liquors. They seem to have no sort of religion, nor to have any object of adoration among them. They have no kind of government; and no man is superior to another, but as he excels in strength or in courage, and in having the greatest number of wives and children. They have no marriage ceremony; a wife is considered as property; and a husband lends one of his wives to a friend. The women marry young. The men are extremely indolent, and the women are mere drudges, doing every thing except procuring food. They sew with the sinews of deer, and their needle-work is very neat. They have few diseases, and are consequently without physicians; but they imagine, that tying to their neck or wrists the particular part of some fish or animal, according to the complaint, will effect a cure. They have never been visited with the small-pox. These Indians cannot reckon numerically beyond six; and their compound numbers reach no far-

ther than 21; every thing beyond this is a multitude. Their dread of the mountaineers makes them live always upon the sea-shores. Their canoes are extremely long in proportion to their breadth, being upwards of 20 feet by two, and contain only one person; they are covered with skins, and extremely light, so that they are easily overset, and yet there is not one among these people who can swim. They navigate their shallows without a compass, in the thickest fogs, and are very good coasters. Their dogs, of which they have a great number, serve as a guard, and as food; their skins supply them with clothing; and in winter they draw their sledges. They cannot bark, but make a most hideous howl; they are large, and have a head like a fox, whereas the dogs of the mountaineers are very small. The weapons of these Indians are the dart, and the bow and arrow, but they are not very expert in the use of either. Their number cannot be accurately ascertained; Mr. Curtis made some attempt for this purpose by counting the number belonging to each tribe, estimated by the number of boats, and by that of the men, women, and children belonging to each boat; estimating them in this way, he reckons their number to be 1623. Mr. Cartwright says, that these Esquimaux were the best tempered people he ever met with, and the most docile; nor, as he says, is there a nation under the sun with which he would trust his person and property in preference to them; although till within these few years they were never known to have any intercourse with Europeans, without committing theft or murder, and generally both.

The business carried on by the English with Labrador is the same with that on the island of Newfoundland. The exports are cod-fish, salmon, oil, whalebone, and furs; but the latter are much better than any of the same kind obtained upon that island, nor do few parts of the world produce better. N. lat. 50° 30' to 62° 30'. W. long. 55° 30' to 78° 30'.

LABRADOR *Lake*. See *St. Peter's Lake*.

LABRADOR *Spar*, in *Mineralogy*. See *FELDSPAR*.

LABRADOR *Stone*. See *FELDSPAR*.

LABRADOR *Tea*, in *Gardening*, the common name of an evergreen plant of the more hardy kind. See *LEDUM*.

LABRISULCIUM, a term in *Surgery*, derived from *labrum*, or *labium*, a lip, and *fulcus*, a deep sore, and signifying sometimes a chap of the lip; but frequently the disease well known under the appellation of the cancerum or gangrena oris. See *GANGRENA ORIS*.

LABRIT, in *Geography*, a town of France, in the department of the Landes, and chief place of a canton, in the district of Mont-de-Marsan. The place contains 584, and the canton 44 inhabitants, on a territory of 407½ kilometres, in nine communes.

LABRUS, in *Ichthyology*, a genus of the thoracic order. This tribe of fishes is extremely numerous, and comprehends many species of peculiar beauty and variety both in form and colours; their general aspect is rather more distinguished for elegance than singularity, but the diversity of those brilliant tints with which nature has embellished them is almost endless. We are little acquainted with their manners of life; such as have occurred to our own observation appear to be those of the natural inhabitants of the marine element; some delight to reside in the shallows and rocky bottoms of the sea contiguous to the boldest shores, but the far greater portion of the species are so widely dispersed through the immensity of seas as rarely occur to notice; and few, or indeed scarcely any, are known in the regular fisheries in any part of the globe. The flesh of those occasionally introduced for the table are of an agreeable and excellent flavour, such

as the "old wife," and some others. The smaller kinds are used chiefly by the fishermen as bait.

The confusion prevalent among authors respecting this family of fishes is inconceivably great; a circumstance the more remarkable in our ideas, since the obvious character of the genus does not appear ambiguous. The confusion arises from that want of precision in the definition of the true character which is too perceptible in the writings of ichthyologists in the early part of the last century, and which led them to admit indiscriminately with the Labri many kinds that ought not to have been included in the same genus. Some of these errors have been progressively detected and amended by referring the fishes improperly classed as Labri to other genera. But for others apparently not less exceptionable, we must place our trust in their descriptions only, the objects described being unattainable; and while this uncertainty continues, it will be concluded the whole of the presumed species of Labrus can never be reduced to very satisfactory order.

On a retrospective view we need not perhaps refer beyond the 10th edition of the Linnean "Systema Naturæ;" in this we find the genus Labrus with the following essential character. Teeth acute; gill membrane with six rays, and the covers fealy; and the dorsal fin with a filiform skin extending beyond the end of the posterior rays. This is the Linnean character in its latest state of improvement, excepting only that it is added, with a laudable degree of caution, that the two genera Labrus and Sparus are so closely allied, as to render it difficult to distinguish them: "Labri et Spari genera ob affinitatem etiamnum difficilium distinguuntur." Linneus describes altogether about forty species, some of which had been described in his former works as of the Labrus, Sparus, and Sciæna genera, and for these, with the exception of a few new kinds in Mus. Ad. Fr. he stood indebted to the labours of his friend Artedi, or to those of Gronovius, Ray, and Cateby, by whom some were called Labri and others Spari.

Gmelin endeavoured to amend the essential character of Labrus by rendering it more comprehensive, and for this reason adds to the character before-mentioned that the lips are simple; the pectoral fins pointed, and the lateral line straight. Still this was found insufficient, and is, in our ideas, confessedly inferior to the very excellent and concise character by which Bloch distinguishes the genus, namely, the lips large, the upper one double and extensile: the genus possesses other characters, but this is the most material. Another attentive observer of nature, Monf. Commerfon, has offered some improvements in the institution of the genus Labrus, and has added to the genus many new species. One of the latest and most copious writers on this subject however remains to be noticed, namely, count Lacepede, a naturalist who undertook the task of reforming the whole system of classification, and one to whom science is indebted in a great measure for the number of new species introduced of late years to the knowledge of the world.

To the Linnean naturalist, the arrangement proposed by Lacepede will rather, we apprehend, appear an innovation, than improvement. In this respect, considering the very concise view the limits of our article will allow us to take of this subject, we are not disposed to exercise much critical remark, or we conceive it would not be impossible to ascertain that it partakes of the character both of improvement and innovation. Our own opinion is, that the Linnean definition, though extremely useful, is inadequate, and that the character assigned by Bloch, though still more concise, is better. We allow, moreover, the necessity of reformation; many of the Linnean Labri belong to other genera, and

there are, besides, species more recently referred to the genus Labrus which rather constitute new genera. Hence the necessity of forming a larger number of genera, by dividing the Labri, is admitted; but in allowing this, it still remains a question, whether Lacepede has not fallen into a greater error than that he endeavours to reform; for instead of permitting them to remain in a single genus, he constitutes no less than seven new genera of the Labri, and their immediate dependencies. In extenuation, it may be indeed observed, in the language of one of his continental admirers, "this intelligent writer found the genus (Labre) so vitiated, that he was under the necessity of forming so many new genera. This increase of genera might seem to have diminished the number of species in the Labre to a trifling amount, but, on the contrary, by the introduction of the new kinds very recently discovered, they are again advanced to the number of one hundred and thirty species."

The genera into which Lacepede divides the Labrus of Linneus, and other authors, are LABRUS, HIATULA, OSEPHRONEMUS, CHEILINUS, LUTJANUS, TRICHOPODUS, and CHEILODIPTERUS.

LABRUS, according to this writer, is characterized by having the upper lip extensile; neither incisive teeth nor grinders; gill-covers destitute of spines and denticulations; dorsal fin one, extending nearly from the nape almost to the tail, and composed of rays terminating in a filament. This genus (which Lacepede separates, chiefly according to the furcated or rounded form of the tail, into three sections) includes a great number of the Linnean genus Sciæna, as the species capa, lepisma, unimaculata, gibba, cinerascens, armata, and fusca, with many others; and, on the contrary, the number of Linnean Labri is less extensive than might be imagined, it includes his species lunaris, venosus, and guttatus; but the genus consists principally of new fishes.

HIATULA is a genus established for one species (Labrus hiatula) of Linneus, which, being destitute of any anal fin, cannot, says Lacepede, remain with the rest. This he calls *Hiatula gardenienne*.

OSEPHRONEMUS is a genus instituted by Commerfon, from whom it was adopted by Lacepede. Its character consists in having five or six rays in each thoracic fin, the first of which is a spine, and the second terminated by a long filament. This genus contains only the species Goramy and another.

CHEILINUS is a genus established for the reception of the Linnean Labrus scarus, and a new species observed by Commerfon, the species triohé. The upper lip is extensile; gill-covers destitute of spines or teeth, and a single dorsal fin.

LUTJANUS was originally established by Bloch, from whom it was adopted by Lacepede; it forms a most extensive genus, and comprehends species from several of the Linnean genera, as *Perca digna*, *striata*, *argentea*, and *nobilis*; *Sparus virginicus*, and *Cbetodon arauus*, together with the *Labri striatus*, *scina*, *lappina*, *ramentofus*, *ocellatus*, *adriaticus*, &c. Its character is, that one or more plates of the gill-covers have a small tooth; the back a single dorsal fin, and sometimes a beard to the jaws.

TRICHOPODUS includes part of the Linnean Labri; the character consists in having a single ray longer than the body to each of the thoracic fins, and one dorsal fin.

CHEILODIPTERUS. The upper lip in this genus is extensile; it has neither incisive teeth, nor grinders; the gill-covers are destitute of spines or teeth, and the back is furnished with two fins. This last genus contains nine species.

Having thus far stated the most material alterations that have taken place in this extensive genus, it only remains to enumerate

enumerate the species, the order of which, in conformity with our original plan, will be reduced as nearly to the arrangement adopted in the Gmelinian system, as the introduction of the more recently discovered kinds will permit.

Species.

\* Tail forked.

**SCARUS.** Transverse appendages at the side of the tail-fan. *Scarus Aulorum*, Arted. *Cheiline fars*, Lacepede.

A native of the Mediterranean, where it appears in shoals, and feeds chiefly on fuci, and other marine plants. The length is about twelve inches, the scales large and thin, and the front teeth broad and blunt. The flesh of this species was esteemed a delicacy among the ancient Romans, and in their days of luxury, obtained, if we may credit Oppian, the most extravagant price. It seems to be most abundant near the shores of Greece.

**ANTHIAS.** Body entirely reddish. Art.

Inhabits southern Europe and America. Gmelin conceives, from the ferrated operculum, it may be a perca. Bloch constitutes it a distinct genus, under the name of *Anthias*.

**CRETENSIS.** Teeth four, body greenish. Art.

Inhabits Candia, and the adjacent places.

**HEPATUS.** Lower jaw longer; body with transverse black lines each side. Art.

An European species found in the Mediterranean sea, and sometimes in the rivers adjacent. The dorsal fin has ten spinous rays, and twenty-one soft ones, and behind the former a black spot.

**GISEUS.** Tail sub-bifid; body somewhat greyish. Gmel. *Turdus pinnis branchialis carens*, Catesby.

A native of America. Catesby has figured this species without pectoral fins, says Gmelin, and distrusts his accuracy; from a reference to the preliminary observations, it will be however remarked, that Lacepede admits its correctness, and institutes a new genus of this species only.

**LUNARIS.** Tail-fin truncated in the middle; dorsal and anal with a purple line; lips folded. Gmel. *Labrus oblongus*, &c. Gronov. *Le croissant*, Bonnaterre.

An inhabitant of the South American and Indian seas. The body is oblong-violet, with bands of yellow disposed transversely; the dorsal and anal fin yellow, except the violet line.

**GALLUS.** Caudal fin truncated in the middle; dorsal and anal with violet lines at the base; lower lip with a doubling each side. Gmel. *Scarus gallus*, Forst.

Described by Forstall among the fishes of Arabia; the body is dusky green, with violet lines all over the body, the belly with two blue stripes, and an intermediate one of green; scales lax, striated, membranaceous at the edge, and marked with a transverse purple band; eyes remote, with red pupil; teeth in one row; tail yellow in the middle, violet towards the sides, and edged with blue. The flesh of this kind is accounted poisonous.

**PERCUREUS.** Caudal fin truncated in the middle; dorsal and anal with a longitudinal purple repandate stripe at the base. Gmel. *Scarus purpureus*, Forst.

Inhabits the shores of Arabia; the length eighteen inches; body somewhat lance-shaped and truncated, colour dusky-green, with three purple stripes each side, beneath blue; scales broad, rhombic, striated, and loosely imbricated; crown convex, naked and brown, with a purple triangle each side before the eyes; gill-covers naked, with a square purple spot; lateral line ramose. The flesh of this fish is esteemed good.

**PITTACUS.** Caudal fin truncated in the middle; edge of

the fins, abdominal stripe, and marks on the head black. Gmel. *Scarus pittaureus*, Forst.

The body of this species is greenish, with yellowish lines; eyes small and remote; jaws of two bones, the lower one with one tooth each side, the upper three; gill-cover with loose scales; lateral line somewhat ramose, and double, the first near the back, the other in the middle; fins purple. A native of Arabia. Perhaps of the scarus genus?

**PITTACULUS.** Green, with three longitudinal red stripes on each side; dorsal fin yellow, with longitudinal red band. L. *pernobe*, Lacepede. *Parrakeet labrus*, Shaw.

Described from a drawing by Plumier. The species inhabits the American seas. Over each eye is a black streak; tail yellow, with four or five curved bands of blue and red.

**NIGER.** Tail truncated in the middle; down the chin a dusky green longitudinal stripe. Gmel. *Scarus niger*, Forst.

An Arabian species found near the shores of the sea. The jaws are bifid, the blotches on the head and outer margin of the fins blue-green; lips edged with red, and then greenish-brown; teeth in the upper jaw two, canine and white; fins violet-brown; pectoral obscure, ferruginous and brownish at the base; tail greenish, the angles lanceolate.

**CHANUS.** Head with three bluish rivulets each side, under the eye a blue square spot. Gmel.

Colour above brown, beneath white; lower jaw longer, between the eyes two furrows diverging behind; anterior gill-covers ferrated at the back part, posterior tridentate; pectoral, ventral, and anal fins yellow; dorsal and caudal spotted with red. Inhabits Turkey, near Constantinople.

**OPERCULATUS.** Body with ten brown bands; gill-covers with a brown spot. Linn. Amoen. Acad.

A native of Asia.

**PAVO.** Body varied with green, blue, sanguineous red, and hoary. Gmel. *Labrus pulchre varius, pinnis pectoralibus rotundatis*, Art. *Labrus pavo*, Hasselquist. *Peacock labrus*.

Length twelve inches. Inhabits the Mediterranean sea, near Syria.

**AURATUS.** Gill-covers fin-shaped. Gmel. *Perca fluviatilis gibbosa, ventre luteo*, Catesby.

Native of the fresh waters of North America; the iris is yellow; gill-cover with a long, obtuse, black membrane at the tip; the tail bilobate.

**TRICHOPTERUS.** Ventral fins with one ray. Pallas. *Sparus*, &c. Koelreuter.

Length four inches, the body carinated behind, slightly undulated with brown and pale, the middle of the sides and base of the tail with a round brown black spot, surrounded by a paler circle. An Indian species of the marine kind.

**FALCATUS.** Dorsal and anal fins falcated, the five first rays unarmed. Gmel.

Inhabits America, the colour silvery, and length of the breast; the teeth are acute, and the ventral fins small.

**RUFUS.** Tail lunate; body entirely tawny. Loefl. *Turdus fluxus*, Catesby.

An American species.

**ZELANICUS.** Tail lunate; body above green, beneath pale purple. Ind. Zool.

An edible fish. It inhabits Ceylon. The head is blue, the gill-covers green, with purple lines; pectoral fins with a purple spot in the middle, and edged with blue; ventral blue; dorsal and anal bluish-purple edged with green; tail in the middle yellow, each side streaked with red, at the base blue.

**AVENA.** Body silvery; rays of the dorsal fin two—five, and nearly unarmed. Forst.

Inhabits the sandy shores of Arabia. The length six inches; body oblong; belly straight, and sometimes marked with interrupted stripes; the lips are equal, the upper protractile; teeth numerous and very short; lateral line nearer the back, and almost parallel; tail bilobate, the lobes lanceolate, and the fins glaucous.

**CATENULA.** Lower jaw longer; back elevated; on each side eight series of very small equal spots, and two transverse bands upon the nape. *Le labre chopetet*, Lacepede.

Observed by Commerçon in the Indian seas. This and several of the following new species are probably species of the Linnæan *Sciæna*.

**LONGIROSTRIS.** Snout much advanced; gill-covers of two pieces. *Le labre long-muscau*, Lacepede.

Found with the preceding.

**MELAPTERUS.** Fins black; head bare of scales. *Labrus melapterus*, Bloch. *Le labre à nageoires molles*, Buff.

A native of Japan.

**SEMI-RUBER.** Four teeth in the upper jaw larger; anterior half of the body red, the posterior yellow. *Le labre demi-rouge*.

Observed by Commerçon in the Indian seas. The base of the posterior part of the dorsal fins scaly.

**PUNCTULATUS.** Upper lip large, thick, and plicated; three longitudinal rows of black dots on the dorsal fin, and one on the posterior part of the anal fin. *Le labre tetracanthæ*, Lacepede.

Native country unknown.

**SEMIDISCUS.** Pale, with numerous black transverse bands; tail terminated in a clear pale crescent. *Le labre demi-disque*, Lacepede.

The bands across the body of this fish are about nineteen in number, and the dorsal fin festooned. A species found in the Indian seas.

**DOLIATUS.** Grey, with about twenty-three transverse brown bands; caudal fin crescent-shaped. *Le labre cercle*, Lacepede.

A native of the Indian seas.

**HIRSUTUS.** Six larger teeth in the upper jaw; lateral line hirsute with small spines; body with numerous longitudinal lines. *Le labre hérissé*, Lacepede.

Inhabits the Indian seas.

**FURCATUS.** Lower jaw longer; teeth small; lobes of the caudal fin pointed and very long. *Le labre fourchu*, Lacepede.

Found in the same seas as the former.

**SEX-FASCIATUS.** Opening of the mouth very small; lower jaw longer; body with six transverse bands. *Le labre six bandes*, Lacepede.

Observed with the preceding by Commerçon.

**OCTO-VITTATUS.** Teeth in the upper jaw much longer; on each side the body four somewhat oblique rays. *Le labre huit raies*, Lacepede.

Found in the Indian seas. The tail in this kind is crescent formed.

**LEVIS.** Lower jaw longer; teeth large, recurved, and equal; lateral line nearly straight; body with five large transverse spots or bands. *Le labre lisse*, Lacepede.

A native of the Indian seas.

**GOUANI.** Each gill-cover composed of three plates, and terminating in a large rounded projection; lateral line obsolete; between the thoracic fins a pointed process. *Le labre gouan*, Lacepede.

Country unknown.

**MACROPTERUS.** A black spot on the posterior angle of

the gill-covers; nearly all the rays of the fins terminating in filaments. *Le labre macroptere*.

A species met with in the Indian seas by Commerçon, in his voyage round the world.

**PLUMIERI.** Head rayed with blue; body silvery, with spots of blue and golden-yellow, and curved transverse band on the tail. *Le labre plumierien*, Lacepede.

Found in the American seas.

**ENNECANTHUS.** Lateral line interrupted; body with six transverse bands, and two on the tail. *Le labre enne-cantbe*, Lacepede.

Each jaw is furnished with two or four large and very strong teeth, and the scales are considerable in point of size. Its native place is unknown.

**KISMIRA.** Head with seven small blue rays each side, and four larger of the same colour each side of the body; tail crescent-shaped. *Le labre kismira*, Lacepede.

Native of the Red Sea.

**IRIS.** Gill-covers composed of four plates, and ending in an angular projection; a large oval black spot with white annulation at the posterior part of the dorsal fin.

Inhabits the fresh waters of Carolina, where it is very common, and is esteemed as an edible fish.

\*\* *With tail entire.*

**HIATULA.** Anal fin none; body with six or seven black bands. Linn.

Communicated to Linnæus by Dr. Garden. The species inhabits Carolina, and constitutes the genus *hiatula* of Lacepede. Whether *L. griseus* before mentioned be really of this genus, or is defective only in the representation, appears uncertain. Should it actually be destitute of the anal fin, as described, it must probably be placed in the same genus (*hiatula*) as this species, notwithstanding the difference in the form of the tail.

The lip in the present fish is retractile, and wrinkled within; jaws beset with sharp teeth, those in the palate orbicular; gill-covers punctured at the edge; spinous rays of the dorsal fin equal, on the posterior part black.

**MARGINALIS.** Subfuscous; edges of the dorsal and pectoral fins tawny. Locell. it.

Inhabits the ocean.

**FERRUGINEUS.** Sides blueish, with a longitudinal, tawny, indented stripe each side. Gmel.

An Indian species.

**IULIS.** Body above fuscous and green; beneath white, with a fulvous dentated stripe each side; two fore-teeth longest. *Donov. Brit. Fishes. Labrus iulis; supra fuscus viridisque subtus albus vitta fulva utrinque dentata, dentibus duobus primoribus supra longioribus*, Ibid. *Labrus iulis*, Linn. *Labrus iulis*, Bloch?

“Discovered on the coast of Cornwall in the year 1802. As a native of the Mediterranean sea, this fish is mentioned by various writers; but as a British species it is perfectly new, not having been recorded as such either by Willoughby, Ray, Borlase, Pennant, or any other writer on the zoology of this country.”—“This fish has arrested the attention of many ichthyologists among the ancients as well as moderns, the former of whom pronounced it the most beautiful of European fishes. It may be collected from the works of Ælian, Aristotle, Salvian, Aldrovandus, and others, that this fish is common at certain seasons in the Mediterranean. Ælian speaks of it, however, as a poisonous fish, and of such a venomous nature that it would be unsafe to eat it, or even the flesh of any other fish that had been touched by it. Galen mentions it, on the contrary, as wholesome food. The male of this species is distinguished,

guished, according to some writers, by having the back of a black colour, instead of green, as in the female; but it appears in this and other respects to be an extremely variable species. Neither are its habits and manners correctly known. It is generally asserted that it swims in small shoals: Aristotle speaks to this effect; but this is contradicted by Salvia and others, who describe it as a more solitary fish, &c." Vide Brit. Fishes.

The usual length is about seven or eight inches.

**PAROTICUS.** Lateral line curved; fins rufous; gill-coverers æræulean blue. Linn. Mus. Ad. Fr. Native of India.

**SUILLUS.** Dorsal fin filamentous; above the tail a black spot; dorsal spines nine. Linn. Fa. Suec. *Sparus berg fhytra*, It. Wg.

Inhabits the shores of Europe.

**STRATUS.** Dorsal fin filamentous; body with white and brown lines. Linn.

Native of America.

**GUAZA.** Fuscous; tail rounded, the rays extending beyond the membrane. Loeff.

Inhabits the ocean.

**OCCELLARIS.** Dorsal fin filamentous; an ocellate spot at the base of the tail. Linn.

Country unknown.

**PUNCTATUS.** Dorsal fin filamentous; body with longitudinal lines spotted with brown. Gmel. *Sciæna*, &c. Linn. *Labrus*, Gronov.

Found in Surinam.

**MELOPS.** Dorsal fin filamentous, and with the anal variegated; behind the eyes a brown crescent. Linn.

Inhabits the south of Europe.

**NILOTICUS.** Dorsal, anal, and caudal fins clouded. Linn. *Labrus niloticus*, Hasselq.

Inhabits Egypt.

**OSSIFRAGUS.** Lips doubled; dorsal fin with thirty rays. Linn.

An European species.

**RUPESTRIS.** Dorsal fin filamentous; tail with a brown spot at the upper edge. Gmel. *Sciæna*, &c. Linn. *Caradse*, Ströem.

Found on the rocky shores of Norway.

**ONITIS.** Dorsal fin filamentous; belly spotted with cinereous and brown. Linn.

Country unknown.

**VIKIDIS.** Green, with a blue line each side. Art.

Inhabits the Mediterranean.

**LINÆATUS.** Fins greenish, the dorsal one ramentous; body green, with numerous yellowish longitudinal lines. Donovan. Br. Fishes.

"A new and highly interesting species, described on the authority of an example found by captain Bray on the coast of Cornwall. This specimen, which is in our possession, is seven inches in length; the prevailing colour greenish, with the belly yellowish," &c. Vide Br. Fishes.

**LUSCUS.** All the fins yellow; upper eye-lid black. Linn.

Country unknown.

**LIVENS.** Tail rounded; dorsal fin filamentous; body livid brown. Linn.

**EXOLETUS.** Dorsal fin filamentous; body lined with blue; anal fin with five spines. Müll. Zool. Dan.

Inhabits the Atlantic and Norway seas, and also Greenland, though rarely.

**SINENSIS.** Dorsal fin filamentous; body livid; crown retuse. Gmel.

An Asiatic species.

**JAPONICUS.** Fine yellow. Houttuyn.

Length six inches, and inhabits Japan.

**BOOPS.** Lower jaw longer; dorsal fin two. Houttuyn.

Found in Japan with the latter.

**TINCA.** Dorsal fin ramentaceous; body yellowish, variegated with blue and red spots; fins red, with fuscous margins, and dotted with white. Donovan. Br. Fishes. *Pinna dorsali ramentacea, corpore flavescente cæruleo variegato rubroque maculato, pinnis rubris sifco marginalis albo-guttatis*, Ibid. *Labrus tinca*, Linn. *Labrus vetula*, Bloch. *Turdus vulgatifissimus*, Will. *Vielle, poule de mer, gallat*, Belon. *Wraffe, or old wife*, Ray.

Most writers concur in admitting the labrus tinca as a fish almost, if not exclusively, peculiar to this country. "Habitat in maris Britannici profundis scopulosis," says Gmelin; and this opinion is sanctioned by the countenance of Lacedæpede and others. Hence it cannot be improper to regard it chiefly as a British production; and as such, it will not be amiss to repeat some observations that have been already delivered by us on this subject, in the volumes of British Fishes to which we have before adverted.—"This charming species of wrasse cannot but be considered as one of the most beautiful of the fish tribe observed to this time on the coasts of Britain," &c.—"We have obtained this species from Scarborough, and other eastern coasts of England, more than once; we have received it also from Cornwall, from the Skerry islands, north of Anglesea, and from Scotland; but have been uniformly led to believe it a species not very common on either of these coasts, except near Scarborough. The usual length of this species is about fifteen or eighteen inches, and its form rather bulky in proportion to the length. The prevailing colour is yellowish, inclining to greenish or olivaceous on the back, and white towards the belly; the markings variable in form, and diff ring much in colour. The whole of the back and sides are spotted with red, varying in different specimens from a deep or purplish crimson to a reddish-orange, and even in some varieties almost to fulvous, and curiously marked with irregular lines, dots, and specklings of æræulean blue, especially about the head; the fins are red, with a broad dusky border inclining more or less to purple, and elegantly marked with numerous roundish dots of white. Bloch considers the dusky border of the fins (which in the specimen he delineates is black) as a sufficient indication of the species. In his fish, the black border was distinct only in the ventral, anal, and caudal fins; to which may be added, that the dorsal fin is commonly dusky or purplish, as well as those before mentioned.

"Bloch describes this fish under the title of labrus vetula, and as a native of the coasts of Brittany, Normandy, and the North sea; from the last of which he received it through the medium of his friend, M. Spengler. Gmelin, as before remarked, speaks of it as an inhabitant of the British coasts, probably on the authority of Ray and Willughby. But the species is not confined to Europe; a specimen of it, taken among a variety of other fishes by captain Cook in the South seas, is at this time in our collection.

"The haunts of this fish are deep waters on the boldest rocky shores, where it subsists on crabs and tellaceous animals; for the maceration of which, the three tuberculated bony processes of its throat are admirably constructed. This fish takes bait eagerly, and is more commonly caught with the hook and line than in the net, or by any other mode of capture.

"It appears Mr. Pennant had not considered the varieties of this fish attentively, or, we think, the ballan wrasse would not have been described as a species distinct from the labrus tinca.

tinca. The ballan wrasse of that writer is certainly the same as our fish, from which it differs only in being of a paler colour, and in having the body marked with yellowish instead of orange or red. Such pale coloured varieties occur pretty frequently, and are indeed more common than those of deeper or more lively colours. Dr. Turton suspects the ballan wrasse to be a variety only of the labrus tinca of Linnæus, though he describes it as a species with this distinctive character: "Body yellow, spotted with orange; above the nose a deep fulcus; farther gill-cover with a deep depression radiated from the centre." In these particulars Dr. Turton was misled by the account given by Mr. Pennant, without reflecting that the same characters apply precisely to labrus tinca. Mr. Pennant informs us, the ballan wrasse "was the form of the common wrasse, only between the dorsal fin and tail was a considerable sinking; above the nose was a deep fulcus; on the farthest cover of the gills was a depression radiated from the centre." It is already shewn that the spots on this fish vary considerably; to which may be added, that the sinking between the dorsal fin and tail is conspicuous in all the varieties of labrus tinca, and so also is the fulcus above the nose. With regard to the last characteristic, the radiated depression on the gill-covers, one, two, or more such depressions are apparent on those parts, when divested of the large scales that adhere to them; every scale, of which there are several on the gill-covers, leaving such a radiated depression on the thin membrana eous skin, when taken off. Those particulars inclined us to believe Mr. Pennant was in some measure deceived by the imperfect state of the Scarborough specimen he examined; and our opinion has been since confirmed by various circumstances. Mr. Travis, the son of the medical gentleman who furnished Mr. Pennant with the specimen he describes, informs us the ballan wrasse is the individual fish commonly known by the name of *old wife* among the fishermen on the Scarborough coasts, where it appears in shoals during summer, and that there is only one sort found in those parts. This kind we have examined, and have no hesitation in stating it to be the ballan wrasse of Pennant, and the labrus tinca of every other ichthyologist." Vide Brit. Fishes, vol. iv.

In the details above mentioned we find some further arguments on this subject, which the limits of our article cannot permit us to repeat. For the length of the present digression we must indeed offer an apology, and this will doubtless be accepted on the following grounds. The Ballan wrasse of Mr. Pennant has been almost uniformly admitted as a species by the best writers; when the account from which the preceding extracts were taken was published, we were aware it was received as a species by several respectable writers, and since that period, we have observed it included as such by a modern continental writer, M. de Bosc, under the name of le labre ballan; he speaks of it on the authority of English authors, and as a native of this country only. To correct this error, it will be admitted, was desirable, and it was certainly no less incumbent in declining to describe the ballan wrasse, to explain our motives for such omission.

VARIEGATUS. Red, with about four irregular parallel olive stripes on the sides, and an equal number of blue ones. Donovan. Br. Fishes. *Labrus variegatus*, Gmel. *Striped wrasse*.

A very elegant and local British fish. To Mr. Pennant we are indebted for an account of this species; he was so fortunate as to discover it some years ago; he found it on the coast of Anglesea, off the Sherry islands. The length of his specimen was ten inches, and we procured both sexes at the same place, and of a size rather larger, the female

measuring fourteen inches in length, and the male twelve. Brit. Fishes, vol. i.

CROMIS. Dorsal fin nearly united; second ray of the anal fin very large, thick, and compressed. Linn. Brown, &c. *Caracinus brasiliensis*, Ray. *Guatucepa*, Mareg.

Native of Carolina.

LINEATUS. Oblong; all the rays of the dorsal fin spinous, except the last. Linn.

Inhabits South America and India.

PERDICA. Tail even; back straight; crown smooth; body with indented yellowish stripes each side. Fork.

This and the two following species inhabit the sea about Constantinople.

SCINA. Body greenish, with white and yellow waves; between the eyes an impressed hollow, and before the hollow a groove. Fork.

The middle teeth large; anterior gill-covers slightly serrated behind, posterior unarmed; lateral line interrupted; pectoral fins yellowish and without spots, the rest obscure, yellow, spotted with blue.

LAPINA. Pectoral fins yellow; ventral blue, the rest violet spotted with blue. Fork.

Body oblong-oval, above brown, beneath whitish, the sides greenish-yellow, with three lines each side, each composed of a double row of red spots.

RAMENTOSUS. Greenish-brown; filament of the first dorsal spines twice as long as the ray. Fork.

Native of Arabia; the body lanceolate, spotted with violet on the fins, crown, and under the eyes; or sometimes fine green; scales large, rounded, entire, and disposed in nine rows from the belly to the back.

OCELLATUS. Greenish, with a scarlet ocellate spot behind each eye. Fork.

Inhabits the shores of Syria; the body suboval, back yellowish-brown, and the head marked with blue irregular lines.

LUNULATUS. Greenish-brown with darker bands, scales with each a ferruginous band; breast speckled with red. Fork.

Length one foot; scales broad and entire. This species inhabits Arabia.

TRIMACULATUS. Red; on each side at the base of the dorsal fin two dark spots, and a third between the dorsal fin and tail. Donovan. Br. Fishes. *Labrus trimaculatus*, Gmel. *Labrus carneus*, le Paon rouge, Bloch. *Trimaculatus wrasse*.

"The length of this species is about twelve inches; its form is graceful, and the colours, when recent, of peculiar elegance and delicacy. A fine orange varying to red upon the back, and becoming paler and whiter towards the belly, is the chief and most prevailing colour. The dorsal fin and tail are fine orange, the former strongly marked with dark purplish-black, and prettily edged with blue; and the rest of the fins paler. The three dark spots at the posterior extremity of the back, which principally constitutes the specific distinction of this kind of wrasse, are of a rich blackish purple. There are also four other spots of a delicate rose colour, situated contiguous to these, and which do not appear to have been mentioned by any writer. Two of these spots are disposed in the space between the three darker ones before mentioned, and the third and fourth are placed one at each extremity of the outermost ones, so as to form together a series of seven spots, which are alternately of a pale rose colour and a very deep purple. This species is uncommonly rare. Our specimen was caught on the coast of Cornwall in June 1801." Vide Brit. Fishes, v. ii.

**OLIVACEUS.** Body olive-green; gill-covers blue at the tip; tail with a black spot. Brunn.

Native of the Mediterranean; the length two inches; body oblong, compressed, beneath inclining to silvery.

**FUSCUS.** Body brown, with blue lines and spots. Brunn.

Length three inches, compressed oblong, beneath whitish. The species inhabits the Mediterranean.

**UNIMACULATUS.** Body lined with olive; dorsal fin behind with a black spot. Brunn.

Inhabits the Mediterranean, and a supposed variety of it, which is reticulated with dusky and greenish filvery, occurs in the Adriatic. The body is three inches long, oval, compressed, and marked with about ten pale blue longitudinal lines.

**VENOSUS.** Green, with anastomosing veins; gill-covers and dorsal fin with a black spot. Bloch.

Native of the Mediterranean; body oval, and compressed; sides of the head with a few longitudinal red lines; filaments and band on the dorsal fin red. Length three inches.

**CRISEUS.** Body grey, with darker spots; tail with a black spot at the base. Brunn.

Length three inches, oval; cheeks lined with blue; fins reddish, with dusky yellow spots. Found in the Mediterranean.

**CUTTATUS.** Body reddish, variegated with black; tail with a spot on the middle of the base. Brunn.

Native of the Mediterranean.

**ADRIATICUS.** Body with four broad transverse brown bands; dorsal fin on the anterior part ten-spined; on the posterior part marked with ocellated black spots. Brunn.

Length three inches; body pale; head with oblique tawny lines.

**LEOPARDUS.** Two teeth in the front of each jaw larger; body speckled with brown; from the eyes to the gill-covers a dark line, and on the tail a black band. *Le labre leopard*, Lacepede.

A species found in the Indian seas, and called leopardus, from the colours and markings on the body, tail, the dorsal and anal fin, resembling those of the leopard. It was discovered by Commerçon.

**BIVITTATUS.** Back red, sides yellow, with two longitudinal brown rays, the upper one of which extends from the eye, the lower from the pectoral fin. *Le labre a deux lignes*, &c. Bloch. *Le labre bivaillé*, Lacepede.

The country unknown.

**MACROLEPIDOTUS.** Yellow; scales large; nine spines in the dorsal fin; beneath the eyes two rows of pores. *Le labre a grandes écailles*, &c. Bloch.

Supposed to be an inhabitant of the Indian seas.

**ALBO-RADIATUS.** Lips very thick; body yellowish, with two very long white rays, and a third above shorter. Mem. Acad. Petr.

Country unknown.

**MARMORATUS.** Marbled with brown and whitish. *Le labre marbré*, Lacepede.

A native of the Indian seas; discovered by Commerçon. The teeth are equal and distinct.

**BERGYLLA.** Scales large; the last rays of the anal and dorsal fin much larger than the others. Bloch, &c. *Le labre bergylle*, Lacepede.

Found in deep seas in the north of Europe: feeds on crabs and shells, and grows to the length of ten or twelve inches.

**HORTULANUS.** Body and tail decussated with dark

stripes, and a spot in each division. *Le labre puertere*, Lacepede.

Native of the Indian seas.

**CALOPS.** Scales large; lateral line straight; near the pectoral fins a large brown spot. *Le labre calops*, Lacepede.

Inhabits the seas of Europe, and is known at Dipppe under the name of "brune." The eyes are large and black; the back dusky.

**ASCANI.** Above red, varied with green spots and streaks, and the under parts yellowish, speckled with red. *Le rose ascanius*.

Length seven inches; green stripes on the dorsal and anal fin about two or three in number; tail green, with the tip red.

**CYANOPTERUS.** Above varied with red, green, and yellow; beneath green and brown; fins blue. *Chelodiptere cyanoptere*, Lacepede.

A beautiful species, found in the American seas.

**CINGULUM.** Anterior parts livid, posterior brown, with an intermediate white girdle; dorsal fin edged with white. Lacepede, &c.

Native of the Indian seas.

**DIANA.** Four larger teeth in the upper jaw; in the lower two; centre of each scale marked with a brown crescent. *Le labre diane*, Lacepede.

An Indian species.

**MACHODON.** Scales large; mouth furnished with four larger curved teeth. *Le labre machodonte*, Lacepede.

**NEUSTIHE.** Back varied with brown, orange, and greenish, the sides marbled with brown, orange, and white. *Le labre Neustihien*, Lacepede.

Found in the Seine, where the fishermen distinguish it by the title of "grande vieille," and "bandouliere marbre."

**CRUENTATUS.** Silvery, with large irregular spots of sanguineous. *Le labre ensanglanté*, Lacepede.

Observed by Plumier in the American seas.

**KARUTA.** Body blackish, with a yellow longitudinal stripe each side, and beneath yellowish with rufous fin. *Jobnius karutta*, Bloch. *Le labre karuta*, Lacepede.

An Indian species.

**CUPREUS.** Somewhat silvery; head, back, and fins, tinged with coppery. *Jobnius aneus*, Bloch.

Shape lanceolate. This species inhabits the Indian seas, and is called Anei kattale by the natives of Malabar.

**ANNULATUS.** Body encircled by nine regular straight bands or rings. *Le labre annelé*, Lacepede.

One of the species found by Commerçon in the Indian seas.

**BRAILIENSIS.** Two teeth in the upper jaw longer and recurved; dorsal and anal fin with two or three longitudinal lines. Bloch, &c.

Found on the coasts of Brazil, where it is taken with the hook and line; the flesh is excellent.

**TESSELLATUS.** Back white, sides silvery, and divided into compartments like a waincoat. *Labrus tessellatus*, Bloch. *Le labre boife*, Buff.

This kind inhabits the North seas. Some French authors call it "perroquet boife."

**CORNUBIUS.** Body variegated with green; near the tail a large fuscous spot; anal fin yellow, obliquely banded with fuscous. Donovan. Brit. Fishes. *Labrus cornubius*, Gmel. *Goldfury*, Ray.

This beautiful species is about a palm's length, the back brownish, beneath which the green prevails, and below this the sides and lower part are yellowish silvery; anal fin golden yellow, whence its name.

**COMBER.** Back, fins, and tail red; belly yellow. *I. corpeo miniato, cauda rotundata*, Gmel. *Comber*, Ray, &c.

A small species of an oblong form, recorded by Ray as an inhabitant of the shores of Cornwall.

**COQUEUS.** Purple and dull blue, beneath yellow. Gmel. Inhabits fame place as the former, according to Ray.

**MIXTUS.** Variegated with yellow and blue; anterior teeth larger. Arted.

Found on the shores of Dalmatia.

**FULVUS.** Body fulvous, Gmel. *Turdus cauda convexa*, Cateby.

A native of America.

**VARIUS.** Varied with purple, green, blue, and black. Art.

Native of the Mediterranean.

**MERULA.** Blackish blue. Art.

An European species.

**CYNAEDUS.** Pale yellow; back purple; dorsal fin reaching from head to tail. Art.

Found in the Mediterranean.

**LABURNUM**, in *Botany*. See **CYTISUS** and **ANAGYRIS**.

**LABURNUM**, in *Gardening*, a common name applied to a beautiful, flowering, ornamental tree, for pleasure and other grounds. There are two sorts of this tree in use generally, which, while young, have much the same appearance in the wood and foliage, but are afterwards readily distinguished by the smallness and fineness of the flowers, and of that of the branches. The fine flowered and more branchy sort, is the most proper for situations where ornament is required, such as shrubberies and pleasure grounds; but the more coarse strob growing kind, succeeds best in poor, gravelly, and rocky situations.

**LABY**, in *Geography*, a town of Sweden, in the province of Upland; 12 miles N. of Uplal.

**LABYRINTH**, *Λαβυρινθος*, among the *Ancients*, was a large and intricate edifice cut out into various isles and meanders, running into each other, so as to render it difficult to get out of it.

There is mention made of four celebrated labyrinths among the ancients, ranked by Pliny in the number of the wonders of the world; *viz.* the Cretan, Egyptian, Lemnian, and Italian.

That of Crete is the most famed; it was built, as Diodorus Siculus conjectures, and Pliny positively asserts, by Dædalus, by command of king Minos, who kept the Minotaur shut up in it, on the model of that of Egypt, but on a less scale: but both affirm, that in their time it no longer existed, having been either destroyed by time, or purposely demolished. It was hence that Theseus is said to have made his escape by means of Ariadne's clue.

Diodorus Siculus and Pliny represent this labyrinth as having been a large edifice; while others have considered it as merely a cavern hollowed in the rock, and full of winding passages. If the labyrinth of Crete, says the Abbé Barthelemi (*Travels of Anacharis*, vol. iv. p. 441, &c.), had been constructed by Dædalus under the order of Minos, whence is it that we find no mention of it, either by Homer, who more than once speaks of that prince, and of Crete, or by Herodotus, who describes that of Egypt, after having said that the monuments of the Egyptians are much superior to those of the Greeks; or by the more ancient geographers; or by any of the writers of the ages in which Greece flourished? This work was attributed to Dædalus, whose name, says our author, is sufficient to discredit a tradition. His name, like that of Hercules, had become the resource of ignorance, whenever it turned its eyes on the early ages. All

great labours, all works which required more strength than ingenuity, were attributed to Hercules; and all those which had relation to the arts, and required a certain degree of intelligence in the execution, were ascribed to Dædalus. According to Diodorus and Pliny no traces of the labyrinth of Crete existed in their time, and the date of its destruction had been forgotten. Yet it is said to have been visited by the disciples of Apollonius of Tyana, who was contemporary with those two authors. (*Philoltrat. Vit. Apoll. l. iv. c. 34.*)

The Cretans, therefore, believed that they possessed the labyrinth. At Nauplia, near the ancient Argos, says Strabo (l. viii.), are still to be seen vaulted caverns, in which are constructed labyrinths that are believed to be the work of the Cyclopes; the meaning of which, as Barthelemi understands him, is, that the labours of men had opened in the rock passages which crossed and returned upon themselves as in quarries. Such, he says, is the idea we ought to form of the labyrinth of Crete. He then suggests an enquiry, whether there were several labyrinths in that island? Ancient authors speak only of one, which most of them place at Cnossus, and some few at Gortyna. Belon and Tournefort describe a cavern situated at the foot of mount Ida, on the fourth side of the mountain, at a small distance from Gortyna: which, according to the former, was a quarry, and according to the latter, the ancient labyrinth. Besides this another is supposed to have been situated at Cnossus, and in proof of the fact it is alleged, that the coins of that city represent the plan of it. The place where the labyrinth of Crete was situated, according to Tournefort, was, as Barthelemi supposes, one league distant from Gortyna; and according to Strabo, it was distant from Cnossus six or seven leagues; with respect to which our author concludes, that the territory of the latter city extended to the vicinity of the former. In reply to the inquiry, what was the use of the caverns, denominated labyrinth, Barthelemi imagines, that they were first excavated in part by nature; that in some places stones were extracted from them for building cities, and that, in more ancient times, they served for an habitation or asylum to the inhabitants of a district exposed to frequent incursions. According to Diodorus Siculus, the most ancient Cretans dwelt in the caves of mount Ida. The people, when inquiries were made on the spot, said, that their labyrinth was originally a prison. It might indeed have been applied to this use; but it is scarcely credible that, for preventing the escape of a few unhappy wretches, such immense labours would have been undertaken. See **CRETE**.

The labyrinth of Egypt, according to Pliny, (*N. H. v. ii. l. 36.*) was the oldest of all; and was subsisting in his time, after having stood, according to tradition, as he says, 4600 years. He says it was built by king Petesuchus, or Tithoës; but Herodotus makes it the work of several kings: it stood on the southern bank of the lake Meris, near the town of Crocodiles, or Arinoe, and consisted of twelve large contiguous palaces, in which the twelve kings of Egypt assembled to transact affairs of state and religion, containing 3000 apartments, 1500 of which were under ground.

This structure seems to have been designed as a pantheon, or universal temple of all the Egyptian deities, which were separately worshipped in the provinces. It was also the place of the general assembly of the magistracy of the whole nation; for those of all the provinces or nomes met here to feast and sacrifice, and to judge causes of great consequence. For this reason, every nome had a hall or palace appropriated to it; the whole edifice containing, according to Herodotus, twelve; Egypt being then divided into so many kingdoms.

Pliny makes the number of these palaces 16, and Strabo makes them 27. All the halls were vaulted, and had an equal number of doors opposite to one another, six opening to the north, and six to the south, all encompassed by the same wall. The exits, by various passages and innumerable returns, afforded to Herodotus a thousand occasions of wonder. The roofs and walls within were incrusted with marble, and adorned with sculptured figures. The halls were surrounded with pillars of white stone finely polished; and at the angle, where the labyrinth ended, stood the pyramid, which Strabo asserts to be the sepulchre of the prince who built the labyrinth. According to the description of Pliny and Strabo, this edifice stood in the midst of an immense square, surrounded with buildings at a great distance. The porch was of Parian marble, and all the other pillars of marble of Syene; within were the temples of their several deities, and galleries, to which was an ascent of 90 steps, adorned with many columns of porphyry, images of their gods, and statues of their kings, of a colossal size: the whole edifice was constructed of stone, the floors being laid with vast flags, and the roof appearing like a canopy of stone: the passages met, and crossed each other with such intricacy, that it was impossible for a stranger to find his way, either in or out, without a guide; and several of the apartments were so contrived, that on opening of the doors, there was heard within a terrible noise of thunder. Although the Arabs, since the days of Pliny, helped to ruin this structure, yet a considerable part of it is still standing. The people of the country call it the palace of Charon. See a plan and description of this labyrinth, in the present state of it, in Pouchock's Hist. of the East, vol. i. p. 61, &c. See also Perry's View of the Levant, p. 381, &c.

Strabo, Diodorus Siculus, Pliny, and Mela speak of this monument with the same admiration as Herodotus; but not one of them says that it was constructed to bewilder those who attempted to pass through it; though it is manifest, that, without a guide, they would have been in danger of losing their way. The Abbé Barthelemi (ubi supra) suggests, that this danger introduced a new term into the Greek language. The word labyrinth, taken in the literal sense, signifies a circumscribed space, intersected by a number of passages, some of which cross each other in every direction, like those in quarries and mines, and others make larger or smaller circuits round the place from which they depart, like the spiral lines that are visible on certain shells. Hence it has been applied, in a figurative sense, to obscure and captious questions, to indirect and ambiguous answers, and to those discussions, which, after long digressions, bring us back to the point from which we set out.

The labyrinth of Lemnos was supported by columns of wonderful beauty; there were some remains of it at the time when Pliny wrote. That of Italy was built by Porfenna, king of Etruria, for his tomb.

**Labyrinth, in Gardening,** a sort of maze or wilderness plantation, abounding with hedges and walks, distributed into many windings and intricate turnings, leading to one common centre, extremely difficult to be found out, designed by way of amusement. This is commonly formed with hedges, in double rows, leading in various twistings and turnings, or backward and forward, with intervening plantations and gravel-walks alternately between hedge and hedge. The great object is to have the walk contrived in so many mazy intricate windings, as to cause much labour and difficulty to find out the centre, or out again in the way a person came in. But they are now rarely introduced into modern garden designs; and scarcely to be seen, except in some old Gardens.

The hedges for this use are usually of hornbeam, but may be of beech, elm, or any other sort of tree or shrub that can be kept in neat order by clipping. The walks should be five feet wide at least, laid with gravel, and neatly rolled; and the trees and shrubs to form the thicket of wood between the hedges of any of the hardy kinds of the deciduous tribe interspersed with some evergreens. In the middle, a space should be left open as the centre. The labyrinth which is, we believe, still in existence at Hampton Court, is almost wholly formed of the common elm tree, cut in so as to keep it down to the proper height.

But small labyrinths are occasionally formed with box edgings, and borders for plants, and alleys for walking in, in imitation of the large ones, and which have good effect in small garden-grounds.

**Labyrinth, in Geography,** a cluster of small islands in the Pacific ocean, discovered in 1722, by captain Roggeveen, 75 miles W. from the Pernicious islands.—Also, a chain of shoals, rocks, and small islands on the E. coast of New Holland, extending from Cape Tribulation to Cape York.

**LABYRINTHUS,** in Anatomy, a name given, on account of its apparently complicated structure, to the internal organ of hearing; to the part, indeed, which, from its receiving the auditory nerve, is the true seat of the sense. See EAR.

**LAC,** or **LACCA,** Gum, as it is commonly, though not very properly, denominated, because it is neither a gum nor a resin, is a kind of compound substance, prepared by the female of a minute insect, called by some *Coccus Lacca*, and by others *CHERMES Lacca*, which is found in several species of trees in the East Indies, and particularly on the banyan-tree (*Ficus indica* and *religiola* of Linnæus), several species of Mimosa, and the Biber on *Rhamnus jujuba*. These insects are nourished by the trees on which they are produced, and fix themselves upon the succulent extremities of the young branches; and around their edges they are environed with a spissid sub-pellucid liquid, which seems to glue them to the branch. It is the gradual accumulation of this liquid, which forms a complete cell for each insect, and is what is called Gum Lacca. When the cells are completely formed, the insect is in appearance an oval, smooth, red bag, without life, about the size of a small cochineal insect, emarginated at the obtuse end, full of a beautiful red liquid. When the eggs are hatched, the young insects, or grubs, first feed upon the red liquid above-mentioned, and when this is expended, they pierce a hole through the coat that invests them, and move off one by one, leaving their exuvie behind, which are the white membranous substance found in the empty cells of the Stick lac. The accumulation of lac appears in the economy of this insect to be the substance that answers the double purpose of a nidus and covering to the egg or insect in the first stage of its existence, and of food for the maggot in its more advanced state. The lac is formed into complete cells, finished with as much regularity and art as the honey-comb, but differently arranged. The flies are invited to deposit their eggs on the branches of the trees by besmearing them with some of the fresh lac steeped in water, which attracts the fly, and gives a better and larger crop. For a particular description of these insects, and their cells, we refer to the papers of Mr. James Kerr, of Patna; Mr. Robert Saunders, surgeon, at Boglepore, in Bengal; and Dr. Roxburgh, of Samulcotta, in the Philosophical Transactions, vols. lxxi. lxxix. and lxxxii. Lac is a staple article of commerce in Aflam, a country bordering on, and much connected with, Thibet, which furnishes the greatest quantity of that in use; and it is also found upon the uncultivated

tivated mountains on both sides of the Ganges. The only trouble in procuring it is that of breaking down the branches, and carrying them to market. The price in Daeca, in 1781, says Mr. Kerr, was about 12s. the hundred pounds weight, although it was brought from the distant country of Affan. The best lac is of a deep red colour. If it is pale, and pierced at the top, it is depreciated in value, because the insects have left their cells, and consequently they can be of no use as a dye or colour; though they may be probably better for varnishers. Of lac there are four kinds known in commerce: *viz.* 1. *Stick lac*, which is the lac in its natural state, from which all the others are formed. This is obtained in pretty considerable lumps, with much of the woody parts of the branches on which it is formed adhering to it. 2. *Seed lac*, which is the former broken into small pieces, garbled, and appearing in a granulated form. 3. *Lump lac*, which is *seed lac* liquefied by fire, and formed into cakes. 4. *Shell lac* is the purified lac, or the cells liquefied, strained, and formed into their transparent laminae. Lac is brought into this state, or purified, by the following process. It is broken into small pieces, and picked from the branches and sticks, and then put into a sort of canvas bag of about four feet long, and about six inches in circumference. Two of these bags are in constant use, and each of them held by two men. The bag is placed over a fire, and frequently turned till the lac is liquid enough to pass through its pores, when it is taken off the fire, and squeezed by two men in different directions, dragging it along the convex part of a plantain tree (*Musa paradisiaca* of Linnaeus), prepared for the purpose: while this is doing, the other bag is heating, to be treated in the same manner. The mucilaginous and smooth surface of the plantain-tree seems peculiarly well adapted for preventing the adhesion of the heated lac, and giving it the form, which enhances its value so much. The degree of pressure on the plantain-tree regulates the thickness of the shell, and the quality of the bag determines its fineness and transparency, upon which its value depends.

The lac is applied to various purposes by the natives in India. A great quantity of the *shell lac* is consumed in making ornamental rings, painted and gilded in a variety of tastes, to decorate the arms of the ladies; and it is formed into beads, spiral and linked chains for necklaces, and other female ornaments. It is also used for sealing-wax. For this purpose, take a stick, and heat one end of it upon a charcoal fire; put upon it a few leaves of the shell lac softened above the fire; keep alternately heating and adding more shell lac, until you obtain a mass of three or four pounds of liquefied shell lac upon the end of your stick. Knead this upon a wetted board, with three ounces of levigated cinnabar, and form it into cylindrical pieces; and to give them a polish, rub them while hot with a cotton cloth.

For japanning, take a lump of shell lac, prepared in the manner of sealing-wax, with whatever colour you please, fix it upon the end of a stick, heat the polished wood over a charcoal fire, and rub it over with the half-melted lac, and polish by rubbing it even with a piece of folded plantain leaf held in the hand; heating the lacquer, and adding more lac as occasion requires. Their figures are formed by lac, charged with various colours in the same manner. In ornamenting their images and religious houses, &c. they make use of very thin beaten lead, which they cover with various varnishes, made of lac charged with colours. The preparation of them is kept a secret. The leaf of lead is laid upon a smooth iron heated by fire below, while they spread the varnish upon it.

For grindstones, take of river sand three parts, of feed lac washed one part, mix them over the fire in a pot, and

form the mass into the shape of a grindstone, having a square hole in the centre, fix it on an axis with liquefied lac, heat the stone moderately, and by turning the axis it may be easily formed into an exact orbicular shape. Polishing grindstones are made only of such sand as will pass easily through fine muslin, in the proportion of two parts of sand to one of lac. The sand is composed of small angular crystalline particles, tinged red with iron, two parts to one of black magnetic sand. The stone-cutters, instead of sand, use the powder of a very hard granite, called *Corundum*. These grindstones cut very fast: when they want to increase their power, they throw sand upon them, or let them occasionally touch the edge of a vitrified brick. The same composition is formed upon sticks; for cutting stones, shells, &c. by the hand.

For painting, take one gallon of the red liquid from the first working for shell lac, strain it through a cloth, and let it boil for a short time, then add half an ounce of fossil alkali; boil an hour more, and add three ounces of powdered load (bark of a tree), boil a short time, let it stand all night, and strain next day. Evaporate three quarts of milk, without cream, to two quarts, upon a slow fire, curdle it with some milk, and let it stand for a day or two, then mix it with the red liquid above-mentioned; strain them through a cloth, add to the mixture 1/2 oz. of alum, and the juice of eight or ten lemons; mix the whole, and throw it into a cloth-bag strainer. The blood of the insect forms a coagulum with the calcous part of the milk, and remains in the bag, while a limpid acid water drains from it. The coagulum is dried in the shade, and is used as a red colour in painting and colouring.

For dyeing, take one gallon of the red liquid prepared as before without milk, to which add three ounces of alum. Boil three or four ounces of tamarinds in a gallon of water, and strain the liquor. Mix equal parts of the red liquid and tamarind water over a brisk fire. In this mixture dip and wring the silk alternately, until it has received a proper quantity of the dye. To increase the colour, increase the proportion of the red liquid, and let the silk boil a few minutes in the mixture. To make the silk hold the colour, they boil a handful of the bark called load in water; strain the decoction, and add cold water to it; dip the dried silk into this liquor several times, and then dry it. Cotton cloths are dyed in this manner; but the dye is not so lasting as in silk. The lac colour is preferred by the natives upon flakes of cotton dipped repeatedly into a strong solution of the lac insect in water, and then dried. The Hindoos, as Mr. Charles Wilkins informed Mr. Hatchett, dissolve shell lac in water, by the mere addition of a little borax; and the solution, being then mixed with ivory-black, or lamp-black, is employed by them as an ink, which, when dry, is not easily acted upon by damp or water. Mr. Hatchett found this fact to be exactly as it was stated by Mr. Wilkins.

Besides the lac above-mentioned, there is another sort which is white or yellowish, brought from Madagascar, very much resembling the *pe-la* of the Chinese, which was found lately examined by Dr. Pearson. See *LACTIC ACID*.

Mr. Hatchett (*Phil. Trans.* for 1804, part ii.), has detailed a number of experiments for the analysis of the three common species of lac, with a view of ascertaining its constituent parts and discriminating properties.

Lac, though long known in Europe, has not much attracted the attention of chemists. The first person who subjected it to a regular examination was the younger Geoffroy, the result of which is published in the *Mem. de l'Acad. de Paris* for 1714. He concluded that this substance is not, as some have supposed, a gum or resin, which

has exuded from vegetables simply punctured by insects. Geoffroy and Lemery obtained from lac, by distillation, some acid liquor, and a butyraceous substance; and Geoffroy observes, that when stick-lac was thus treated, some ammonia was also obtained, but not when feed-lac was employed. Geoffroy considered lac as a kind of wax, very distinct from the nature of gum or resin. Since his time it has been little examined, and therefore chemists have entertained various opinions concerning it. Chaptal, adopting Geoffroy's opinion, calls it a kind of wax; but Gren and Fourcroy regard it as a true resin.

Mr. Hatchett found that when water is poured on stick lac, reduced to powder, it immediately began to be tinged with red, and by heat, a deep-coloured crimson solution was formed. Repeated operations of this kind reduce stick-lac to a yellowish-brown substance, and the water no longer receives any colour. The portion separated from the lac has, on an average, amounted to 10 per cent.; but as it cannot be completely separated, considerable variations must be expected in different samples.

Fine feed-lac does not afford more than  $2\frac{1}{2}$  or 3 per cent. of the colouring matter; and shell-lac, when treated in the same manner, *i. e.* merely with water, did not yield more than  $\frac{1}{2}$  per cent. Alcohol dissolves a considerable portion of each of the different kinds of lac; and when heat is not employed, the dissolved part is resin, combined with some of the colouring matter; but if the lac is digested with heated alcohol, the solution is more or less turbid, and it is difficult to obtain it in a state of purity and transparency, either by repose or filtration. The solution obtained by digesting stick-lac in alcohol, without heat, is of a dark brownish-red colour; and the insoluble part subsides, retaining the greater part of the colouring matter, most easily soluble in water. The proportion of resin thus dissolved, when stick-lac is treated with alcohol, amounted to  $57$  or  $68$  per cent. The feed-lac used by Mr. Hatchett was very pure, and yielded to alcohol about 88 per cent. of resin, containing little of the colouring matter. Shell-lac, in small fragments, by simple digestion with alcohol, afforded in the first instance nearly 81 per cent.; but part of the resin required subsequent operations to separate it, so that the total quantity of resin might be estimated at 91 per cent. Sulphuric ether does not seem to act so powerfully upon the varieties of lac as alcohol; and, therefore, ether is not the best menstruum for lac. Concentric sulphuric acid acts first on the colouring matter of lac; and after a short digestion in a sand-bath, the whole is converted into a reddish-brown thick liquor, which soon becomes black; and the chief part of the lac is separated in an insoluble state, resembling coal. During the solution of lac in sulphuric acid, a considerable quantity of sulphureous acid gas is evolved. When lac is digested with nitric acid, nitrous gas is at first produced; the lac swells much, and is converted into a deep yellow opaque brittle substance, which, by a sufficiency of nitric acid, and a continuance of the digestion for about 48 hours, is dissolved.

This yellow nitric solution is converted by evaporation into a deep yellow substance, which burns like resin, but is soluble in boiling water. Muriatic acid dissolves the colouring matter and gluten of lac with a feeble action, unless the resin has been previously separated. Acetous acid much resembles the muriatic in its effects. Stick-lac, feed-lac, and shell-lac are partially dissolved by acetic acid; and the dissolved part consists of the colouring extract of resin, and of gluten; the wax being the only ingredient which is insoluble in this menstruum. A saturated solution of boracic acid in water dissolves the colouring extract; but

the lac is little, if at all, acted upon by this acid. Subborate of soda or borax has a powerful effect on lac, so as to render it soluble in water; and it is concluded from these facts, that the excess of soda in borax is the active substance, which conclusion is corroborated by experiments made with the alkalis. In order to render lac, especially shell-lac, soluble in water, about one-fifth of borax is necessary. The best proportion of water to that of lac is 18 or 20 to 1; so that 20 grains of borax, and 4 oz. of water, are, upon an average, requisite to dissolve 100 grains of shell-lac. The general properties of the solution shew, that it is a saponaceous compound, which, being used as a varnish, or vehicle for colours, becomes (when dry) difficultly soluble in water. The lixivium of pure soda, and of carbonate of soda, completely dissolve the several kinds of lac; and the solutions resemble those formed by means of borax, excepting that they are deeper coloured. Lixivium of pure or caustic potash speedily dissolves the varieties of lac, and forms saponaceous solutions, similar to that with borax, exclusive of the colour, which more approaches to purple. Lixivium of carbonate of potash extracts a great part of the colouring matter, but less completely dissolves the entire substance of lac than pure potash. Pure ammonia, and carbonate of ammonia, readily act upon the colouring matter of lac, but do not completely dissolve the entire substance.

From a variety of other experiments, as well as those, the results of which we have given, but which we cannot recite, it appears that the different kinds of lac consist of four substances, namely, extract, resin, gluten, and wax. The extract, when dry, is of a deep red colour, approaching to purplish-crimson; emitting smoke when laid on a red-hot iron, with a smell like that of burned animal matter, and leaving a bulky porous coal; partially soluble in water, hot or cold; more slowly in alcohol, and with a less beautiful colour; insoluble in sulphuric ether; soluble in sulphuric, nitric, and acetic acid; partially in muriatic acid; not very readily in acetous acid; almost perfectly soluble in the lixivium of potash, soda, and ammonia, with a beautiful deep purple colour. When pure alumine is put into the aqueous solution, it does not immediately produce any effect, but with the addition of a few drops of muriatic acid, the colouring matter speedily combines with the alumine, and a beautiful lake is formed. A fine crimson precipitate is also produced by muriate of tin, when added to the aqueous solution: a similar coloured precipitate is also formed by the addition of solution of iron-glass. These properties of the colouring substance of lac, especially its partial solubility in water and in alcohol, and its insolubility in ether, together with the precipitate formed by alumine and muriate of tin, indicate that this substance is vegetable extract, perhaps slightly animalized by the cocculus.

The resin of lac is of a brownish-yellow colour, emitting on a red-hot iron much smoke, with a peculiar sweet odour, and leaving a spongy coal; completely soluble in alcohol, ether, acetic acid, nitric acid, and the lixivium of potash and soda; precipitated by water from alcohol, ether, acetic acid, and partially from nitric acid; and possessing the other general characters of a true resin.

The gluten is obtainable in two ways; if the pieces of lac, after digestion in alcohol, be digested with dilute acetic, or muriatic acid, most of the gluten is dissolved, and may be precipitated by alkalis, added in due proportion; but is dissolved by an excess of them, and then is separable by acids. It much resembles the gluten of wheat.

The wax of lac is found floating like oil on the surface of a solution of lac, after long and repeated digestion in boiling nitric acid, and may be collected when cold; or it may

be more easily obtained in a pure state, by digesting the residue left by alcohol in boiling nitric acid. The wax, thus obtained, when pure, is pale yellowish-white, and (unlike bees' wax) is devoid of tenacity, and extremely brittle: it melts at a much lower temperature than that of boiling water, and burns with a bright flame, and an odour resembling that of spermaceti. It is insoluble in water and cold alcohol; but the latter, when boiled, partially dissolves it, and upon cooling, deposits the greater part; soluble in heated sulphuric ether, but upon cooling, nearly the whole is deposited. Lixivium of potash, boiled with the wax, forms a milky solution; but most of the wax floats on the surface in the state of white flocculi, and appears to be converted into a kind of soap of difficult solubility; it is no longer inflammable; and, with water, forms a turbid solution, from which, as well as from the solution in potash, the wax may be precipitated by acids. Ammonia, when heated, dissolves a small portion of the wax, and forms a solution similar to the former; nitric and muriatic acids do not act upon the wax. When the properties of this substance are compared with those of bees'-wax, a difference will be perceived; and on the contrary, the most striking analogy is evident between the wax of lac and the myrtle wax which is obtained from the *Myrica cerifera*. The properties of myrtle wax, described by Dr. Boeckl in Nicholson's Journal for March, 1803, coincide perfectly with those of the wax of lac, that Mr. Hatchett is led to consider them as almost, if not altogether, the same substance.

Our author, from his analysis of the three different species of lac infers, that the substances that compose them bear the following proportions: 100 parts of stick-lac gave 68 of resin, 10 of colouring extract, 6 of wax, 5.5 of gluten, and 6.5 of extraneous substances: 100 parts of seed-lac gave 88.5 of resin, 2.5 of colouring extract, 4.5 of wax, and 2 of gluten: 100 parts of shell-lac gave 90.9 of resin, 0.5 of colouring extract, four of wax, and 2.8 of gluten.

We have already specified several uses to which lac is applied in India, and it is no less important, in a variety of respects in Europe. A solution of lac in water may be advantageously employed as a sort of varnish, which is equal in durability, and other qualities, to those prepared with alcohol; and, of course, much cheaper. It will be found, likewise, of great use as a vehicle for colours; for, when dry, it is not easily affected by damp, or even by water. Mr. Hatchett says, that with a solution of this kind he has mixed various colours, such as vermilion, fine lake, indigo, Prussian blue, sap-green, and gamboge; and it is remarkable, that although the two last are of a gummy nature, and the others had been previously mixed with gum (being cakes of the patent water-colour), yet, when dried upon paper, they could not be removed with a moistened sponge, until the surface of the paper itself was rubbed off. In many arts and manufactures, therefore, the solutions of lac may be found of great utility; for, like mucilage, they may be diluted with water, and yet, when dry, are little, if at all, affected by it.

The colour given by lac is less beautiful, but more durable than that given by cochineal. To render the colouring matter of the lac diffusible in water, so as to be applied to the stuffs to be dyed, Mr. Hellot directs the following process:—Let some powdered gum-lac be digested for two hours in a decoction of comfrey-root, by which a fine crimson colour is given to the water, and the gum is rendered pale or straw-coloured. To this tincture, poured off clear, let a solution of alum be added; and when the colouring matter has subsided, let it be separated from the clear liquor, and dried. It will weigh about one-fifth

of the quantity of lac employed. This dried fecula is to be dissolved or diffused in warm water, and some solution of tin is to be added to it, by which it acquires a vivid scarlet colour. This liquor is to be added to a solution of tartar in boiling water; and thus the dye is prepared.

The method of obtaining the fine red lac used by painters from this substance, is by the following simple process:—Boil the stick-lac in water, filter the decoction, and evaporate the clear liquor to a dryness over a gentle fire. The occasion of this easy separation is, that the beautiful red colour, here separated, adheres only slightly to the outides of the sticks, broken off the trees along with the gum-lac, and readily communicates itself to boiling water. Some of this sticking matter also adhering to the gum itself, it is proper to boil the whole together; for the gum does not at all prejudice the colour, nor dissolve in boiling water: so that after this operation the gum is as fit for making sealing-wax as before, and for all other uses which do not require its colour. See LAKE.

A tincture of gum-lac may thus be prepared:—Take two ounces of gum-lac, reduce it to a fine powder, and make it into a stiff paste with oil of tartar *per deliquium*; let this in an open glass to dry by a gentle heat, then remove it to the open air, that it may relent and grow soft; then dry it again, and repeat this two or three times, at the end of which the hard body of this resin will be found resolved into a purple colour. This may yet again be dried, and when dried must be reduced to powder, which powder will afford a fine strong tincture to spirit of wine, being boiled in it in a tall glass in a sand-heat for two or three hours. And by this process strong tinctures may be made from myrrh, amber, gum, juniper, &c. which will yield no tincture of strength to spirit of wine alone, if treated in the usual way.

A spirituous tincture of stick-lac was formerly sometimes given as a mild restringent and corroborant in female weaknesses, and in rheumatic and scorbutic disorders. But the principal medicinal use of this concrete was as a topical corroborant and antiseptic, in laxisities and scorbutic bleedings, and exulcerations of the gums. Some employed for this purpose a tincture of the lac in alum water; others a tincture made in vinous spirits, impregnated with the pungent antiscorbutics. The college of Edinburgh directed an ounce of the powdered lac, with half an ounce of powdered myrrh, to be digested in a sand-heat, for six days, in a pint and a half of spirit of scurvy grass.

The gum-lac has been lately used as an electric, instead of glass, for electrical machines. See LAQUER, LAKE, and VARNISH.

LAC, or LACCA, *Ammoniaci*, in the *Materia Medica*. See GUM AMMONIAC.

LAC, or LACCA, *Artificial*, or LAQUE, is also a name given to a coloured substance, drawn from several flowers; as the yellow from the flower of the juniper, the red from the poppy, and the blue from the iris or violet.

The tinctures of these flowers are extracted by digesting them several times in aqua vite, or by boiling them over a stove fire in a lixivium of pot-ashes and alum.

An artificial lacca is also made of Brazil wood, boiled in a lixivium of the branches of the vine, adding a little cochineal, turmeric, calcined alum, and arsenic, incorporated with the bones of the cuttle-fish pulverized, and made up into little cakes, and dried.

If it be to be very red, they add the juice of lemon to it; to make it brown, they add oil of tartar.

Dove-coloured, or columbine lacca, is made with Brazil of Fernambuc, steeped in distilled vinegar for the space of a month,

month, and mixed with alum incorporated in cuttle-fish bone. For other processes, see LAKE and Madder.

LAC, *Acid of*. See LACCIC ACID.

LAC, *of Gum Lac*. See CROTON.

LAC LUNÆ. Dr. Platt gives this fossil as a mark of good lime-stone; but it has been observed, that two quarries in Ireland, where lac lunæ was found, were of building stone, but would not burn into lime. Phil. Trans. N° 477. § 9.

There are many varieties of this mineral, differing in their texture and colour. It is found in many parts of Europe, and also in Asia and America. Many of the English quarries in Oxfordshire, Gloucestershire, Northamptonshire, and Derbyshire, afford considerable quantities of it. It adheres to the roofs and walls of grottos and caverns, and is lodged in the fissures of strata of stone, sometimes in form of a farinaceous powder, and sometimes concreted into masses. Its surface is rough and dusky; it colours the hands, adheres to the tongue, melts readily in the mouth, without grittiness, yields an insipid taste, and raises an ebullition in water, which soon dissolves it into a fine white powder. See *Mineral AGARIC*.

LAC Sulphuris, in *Chemistry*, and the *Materia Medica*, denotes sulphur separated by acids from its alkaline solution, which in the process changes its lemon-yellow colour for a grey or yellowish-white like cream. As a medicine it is thought to be somewhat milder. See SULPHUR.

LAC Virginale. See *Virgin's Milk*.

LAC Virginis. See *VIRGIN'S MILK*, and *BENZOIN*.

LACA, in *Geography*, a town of Africa, in the country of the Foulis; 10 miles N.W. of Goumel.

LACABEN, a town of Asiatic Turkey, in the province of Aladulia; 30 miles S.S.W. of Malatra.

LACANITIS, in *Ancient Geography*, a country of Asia, in Cilicia, according to Ptolemy, who places in it one city, viz. Irenopolis.

LACARACOONDA, in *Geography*, a town of Bengal; 10 miles S. of Nagore. N. lat. 23° 48'. E. long. 87° 27'.

LACARIA, a small town of Italy, in the eastern part of Lucania, S. of Heraclea, and near the gulf of Tarentum; founded by a colony of Phocæans, and celebrated for its good wine.

LACAS, LAS, a town of the island of Cuba; 15 miles W. of Villa del Principe.

LACCA. See LAC.

LACCADIVE ISLANDS, in *Geography*, a group of small islands in the Indian sea; the nearest being about 15 miles from the coast of Malabar. They are supposed to be the islands called by Ptolemy "Insulæ numero 19," though in reality they are 32. All of them are small, rocky on their sides, covered with trees, and separated by deep channels. They are visited by English ships in their passage from India to the Persian gulf, or Red Sea. Their principal traffic consists of the produce of the cocoa palm, such as the oil, cables, and cordage, and also of fish, which, being dried, is sent to the continent of India, whence rice is obtained in return. They also trade to Mascate, in large boats, and for their commodities they bring back dates and coffee. Ambergis is often found floating near these islands. N. lat. 10 to 12° 40'. E. long. 71° 15' to 73° 30'.

LACCIA, in *Ichthyology*, a name given by Paulus Jovius to the shad, or, as we sometimes call it, the mother of the pilchards. See CLUPEA *Alola*.

LACCIC ACID, in *Chemistry*, is a substance that was first introduced to the notice of chemists by Dr. Pearson. It is obtained from a peculiar compound called *cubite lac*, which Dr.

Anderfon of Madras discovered to be the product of some insects of the *coccus* tribe. Small quantities of it were sent to Europe about the year 1789; and, at the request of sir Joseph Banks, an examination of it was undertaken by Dr. Pearson, and the result of his inquiries appeared in the Philosophical Transactions for 1794. The lac, in its natural state, is of a grey colour; and occurs in pieces of from three to fifteen grains in weight. Many of its properties present considerable resemblance to those of bees' wax; and Dr. Pearson is of opinion, that these substances are very nearly allied to each other, differing only in the proportion of their constituents. A curious circumstance, connected with this point, is, that the insect which secretes the lac also produces honey; but the phenomena attending the appearance of the latter product have not been examined with the attention which they merit. To procure the laccic acid, it is merely necessary to expose the lac, as afforded by the *coccus*, to a heat just sufficient to liquify it. A reddish watery fluid will separate, having the smell of newly baked hot bread; and it is this substance which constitutes the acid under inquiry. The following are some of its properties. At the temperature of 60°, it has a specific gravity of 1.025. Paper stained with litmus and turfoil is reddened by it. It possesses a saline taste, and is somewhat bitter; but is not in the smallest degree sour. By exposure to the air it becomes muddy, and deposits a small quantity of sediment. Dr. Pearson distilled 250 grains of it, and afterwards evaporated the product until it grew turbid. On standing some hours, acicular crystals were produced, having a bitterish taste, which amounted to about  $\frac{1}{10}$ th of the weight of the fluid employed. The acid dissolves carbonat of soda with effervescence; and by evaporation yields crystals which are deliquescent. It produces a purplish tint on being mixed with lime-water, but no sediment appears. Tincture of galls causes a green precipitate; and with acetat of lead a reddish powder is deposited. This forms nearly the whole of the information that has been conveyed to us with respect to it; and as yet, therefore, nothing either very striking, or very important, has been communicated by the discovery. It is to be lamented that Dr. Pearson had so small a quantity of matter to operate upon in his experiments, as it becomes difficult, from the want of a more complete examination, to ascertain whether the substance is entirely new to us; or whether it is only the modified appearance of some compound with which we had been before acquainted.

LACCOS, *Λακκος*, among the Greeks, a ditch or trench used instead of an altar, when sacrifices were to be offered to the subterranean or infernal gods. See ALTAR.

LACE, in the *Manufactures*, is formed of thread, cotton, or silk, woven into a net, the meshes of which are varied in their figure, according to the design of the pattern, as octagons, hexagons, &c. &c. The lace is also ornamented by a thread, much thicker than the thread forming the net, which is woven in among the meshes, in the figure of flowers, and other fantastic curves; upon the beauty and elegance of which, the value of the lace depends. This thick thread is called the *gimp*.

Lace is made upon a pillow or cushion, upon which a piece of stiff parchment is stretched, having a number of holes pricked through it, to form a pattern of the intended lace. Through these holes, pins are stuck into the pillow; and the threads, wound upon small bobbins, are woven around the pins, and twisted round each other in various ways, to form the required pattern. This process is extremely tedious, particularly for the wide laces, with complicated patterns; and though it is extremely expensive to

the consumer, the people (chiefly in Bedford and Buckinghamshire) who manufacture it can only obtain sufficient to support a wretched existence, by the most incessant exertion. Of late years, the manufacturers of Nottingham have directed their ingenuity to imitate this species of lace by machinery, in which they have succeeded most perfectly: but still it is only an imitation, the knot or loop of the meshes being essentially different. In the pillow lace, the net or meshes may be described, by supposing a number of ropes, each formed of two or more threads twisted round each other: these are extended parallel; but at every two or three spiral turns of these ropes, the strands or threads composing one rope are twisted around with those of its neighbour, and then return to be twisted with its own: and this reciprocally of the whole number forms a netting; the figure of the meshes depending upon the number of turns which are made, before the twist is changed from one rope to the next. To form a lace of this description, it is essential that the ends of each thread be detached, and capable of being twisted over the adjacent threads. This is easily done by the hand upon the pillow, by twisting the bobbins round each other; but has many difficulties which prevent its performance by machinery.

The Nottingham lace is only a modification of the stitch or loop of which stockings are made; all the meshes being formed by a continuance of one thread, which is, by the machine, formed into loops a whole course (that is, length of the intended piece of lace) at once, by pressing it down alternately over and under between a number of parallel needles; a second course is then made of similar loops on the same needles, and the loops of the first are drawn through those of the second, in such a manner as to form meshes by retaining the first loops; the second are then retained by a third course, and this by a fourth, and so on. The machine is very nearly like a common stocking-frame, but provided with an additional apparatus, which can be readily applied. It consists of a frame, containing a number of needles, which we will call points: these are introduced between the fixed needles of the stocking-frame, and a certain number (one half, for instance) of the loops in the thread are taken off the fixed needles upon these points, which are moved endways, the space of two, three, or more fixed needles, and put down upon them again. Another set of loops is now taken upon the points, and moved in the opposite direction; by this means, crossing the loops over each other, and forming meshes, the figure of which will depend upon the number of needles it is thus carried over. But as this admits of no great variety of patterns, another machine has been invented, which is much more extended in its applications. Like the former, it has the parts of the stocking-frame, but differently made. The thread is, in this, rolled upon a cylinder, in the same manner as a weaver's beam; as many threads being wound round it as there are needles in the frame. These threads pass through eyes in the ends of small points, called guides, which are opposite the needles; and these guides are fixed on two bars, each of which has half the guides fastened in it, that is, one guide is fast in one bar, and the next in the other, and so on alternately of the whole. Each of the guides presents a thread to its needle, and are all at once moved by the hand to twist the threads two or three times round the needles which are opposite them: the loop is now made in a manner similar to the other frame. The next time, the alternate guides are shifted endways, so as to apply themselves to other needles than those they were opposite before. This crosses the thread, so as to make a net: but the quantity which is shifted endways is altered every time, by means of the ma-

chinery, so as to move a certain number of needles; which number is altered every time, to produce the pattern. All the parts of this machine, except the guides, are moved by means of treadles, instead of using the hands, as in the common stocking-frame. The net produced by these frames is woven in bands of the width of the intended lace, leaving a wider mesh than the others, through which the division is to be made to separate the lace into narrow strips. Before cutting up in this manner, the lace is spread in a frame, and a common needle with a thick thread is worked in the meshes, to imitate the gimp, according to the pattern for which the lace is intended.

The lace trade of Nottingham has been carried to a very great extent, but is at present in a state of stagnation, being chiefly dependent on foreign trade, as it has never been in such great repute with the British ladies.

Lace is also made of gold and silver thread (which see), much in the same manner as the bone or blond lace above described. The importation of gold and silver lace is prohibited. Great quantities of the finest blond laces have been imported from Flanders. By 3 Geo. III. c. 21. and 5 Geo. III. c. 48. if any person shall import any ribbards, laces, or girales, not made in Great Britain, whether the same shall be wrought of silk alone, or mixed with other materials, the same shall be forfeited, and may be seized by any officer of the customs, in whatever importers', vendors', or retailers' hands they may be found; and the importer, and every person assisting therein, and the vendors and retailers in whose custody they shall be found, or who shall sell or expose the same to sale, or conceal with intent to prevent the forfeiture, shall forfeit respectively 200*l.* with costs; half to the king, and half to the officer who shall inform and prosecute.

LACE is also used for a kind of chord made of silk or cotton, chiefly used in lacing women's stays.

LACE BARK. See DAPHNE.

LACEDÆMON, in *Ancient Geography*, a celebrated town of Greece, in the Peloponnesus, in a country which was originally called Laconia, and afterwards changed into Lacedæmon, or Sparta. See SPARTA. See also LACONIA.

LACEDÆMONIANS, the inhabitants of Laconia, are said to have derived their name from Lacedæmon, heir and successor of Eurotas, whose daughter he married. Their ancient name was *Leleocrates*, which has been found in some ancient inscriptions. The commencement of their history is little known. But their first king, according to the chronology most generally received, was Lelex, surnamed Autochthos, because he was supposed to have been one of the Aborigines; and from him his subjects bore the ancient name of Leleges. He began his reign in the year 1516 B.C., was succeeded by his eldest son Myles, and Myles was succeeded by his son Eurotas, who, having no male issue, appointed for his successor Lacedæmon, the supposed son of Jupiter by Taygeta, to whom he gave his daughter Sparta in marriage. Lacedæmon was the first king of the Lacedæmonian line, which consisted of twelve sovereigns, the last of whom was Tisamenus, who terminated this line in 1104 B.C., upon the return of the Heraclide into the Peloponnesus. In 1102 B.C., upon the division of the Peloponnesus by the Heraclide, the kingdom of Lacedæmon or Sparta commences under Procles and Eurysthenes, the two sons of Aristodemus, the chief of the Heraclide. Eurysthenes was succeeded by his son Agis, from whom the descendants of that line had the appellation of Agidae, or Agiada; and the first princes of the former line were denominated Proclidae, till Eurytion, or Eurypon, the third

## LACEDÆMONIANS.

of this line, exchanged it for Eurytomidæ, or Euryptidæ. In the line of Agis succeeded Pecheltratus 1058 B.C., Labotas 1023 B.C., Doryflus 986 B.C., Ageflans 957 B.C., and Archelans 913 B.C. The fuccellors of Procles were Ivas 1065 B.C., Eurypon 1028 B.C., Prytanis 1021 B.C., Eunomus 989 B.C., and Polydectes 907 B.C. Lycurgus, the fon of Eunomus, fucceeded Polydectes, but he only retained the kingdom till his filler was delivered of a fon, to whom he immediately refigned it; but his fituation being rendered uneasy, he fet out for Crete about eight months after the birth of his nephew. During this voluntary exile of ten years, he meditated that new form of a commonwealth into which he afterwards modelled the government; and for this purpofe he returned to Lacedæmon in the year 884 B.C.

The government of Lacedæmon was, as we have feen, originally monarchial; and though the kings had fome fubordinate magiftrates, chofen by themfelves, of whose counfel they occasionally availed themfelves, yet the will of the fovereign was the fupreme law. Thus the fovereign power paffed through a fucceffion of twelve princes, from Lacedæmon, the fon-in-law of Eurotas, and founder of this monarchy. Under Euryfthenes and Procles the government took a new form, and inftead of having one fovereign, it became fubject to two. Thefe two brothers governed jointly, and with equal power and authority, each bearing the title of king of Lacedæmon, and being acknowledged and obeyed as fuch. In this bipartite condition the government continued under a fucceffion of thirty princes of the line of Euryfthenes, and twenty-feven of that of Procles, and it terminated in both about the fame time. Difcords, however, were unavoidable, and foon commenced. Two parties were formed, and they became turbulent and unmanageable. By the diffentions that were thus occafioned, the regal dignity funk into fuch contempt, that the government was upon the brink of falling into anarchy and confufion, when Lycurgus, as we have faid, undertook the management of it, during fome part of his nephew Charilaus's minority. During the period of his voluntary abfence, when he had travelled through Crete, Afia, and Egypt, the government had become fo corrupt, that not only his friends, but even thofe who had been his moft zealous enemies, were glad to repeat their embaffies, entreating him to return and fave his country from ruin. Thefe were the inevitable confequences of that fatal divifion of the regal authority between two competitors, which Lycurgus took a quite different method of remedying than by confining it again to either of the lines. The plan he adopted was that of reducing their authority, by conflituting a fenate, endowed with the fupreme power in all civil matters, and leaving to the kings, befides the title and honour, only the management of military and religious affairs. In order to qualify him for the important undertaking in which he now engaged, he had paid particular attention to the laws of Minos at Crete, and in Afia he had obferved the effects which are produced by different governments and manners, and he had alfo availed himfelf of the opportunities which Egypt had afforded him of gaining wifdom. With a view of giving greater effect and ftability to his new conftitution, he had, like other legiflators, taken care to fe cure the approbation of heaven. With this view, he confulted the oracle at Delphi, and had received for anfwer: "The gods accept thy worfhip, and under their auspices, thou fhalt frame the moft excellent of political conftitutions." Nor did Lycurgus ever afterwards neglect to maintain a correffpondence with the Pythia, who fucceffively impreffed on his laws the feal of divine authority. He alfo, before he commenced his operations, fubmitted his plan

to the examination of his friends and the moft diftinguifhed citizens; and from thefe he felected thirty, who were to attend him completely armed in the general afsembly, and to defend him from thofe perfonal affaults which he had reafon to apprehend in the promulgation of his laws. At length the new conftitution was approved by all orders of the ftate. Yet, notwithstanding its excellence, it was not affured of duration. Lycurgus, therefore, when the people were afsembled, thus addreffed them: "It ftill remains for me to lay before you the moft important article of my legiflation; but I wifh firft to confult the oracle of Delphi. Promife me that, until my return, you will make no alteration in the laws already eftablifhed." They promifed him. "Swear it," faid he. The kings, fenators, and citizens, called the gods to be witneffes to their words. This folemn engagement could not but be irrevocable, for it was his refolution never more to return to his country. Accordingly he immediately repaired to Delphi, and enquired whether the new laws were fufficient to enfore the happinefs of the Spartans. The Pythia, having anfwered, that Sparta would be the moft flourifhing of cities fo long as fhe fhould continue to obferve them, Lycurgus fent that oracle to Lacedæmon, and condemned himfelf to voluntary banifhment. He died far from the country of whose happinefs he had been the caufe. See LYCURGUS.

In fettling the government of Lacedæmon, Lycurgus was too wife to abandon the admiftration of public affairs to the caprices of the multitude, or to leave it entirely to the will of the two princes on the throne. He fought, as we have already faid, a mean, by which he might refrain and temper power by wifdom; and he thought that he had found it in Crete, where a fupreme council moderated the authority of the fovereign. Such an eftablifhment he introduced at Sparta, under the appellation of a fenate. Twenty-eight aged men, of confummate experience, were appointed to fhare with the two kings the plenitude of power. In this auguft fenate the great interefts of the ftate were to be difcuffed; here the two kings prefided, and every queftion was to be decided by the plurality of voices; and the determinations of this council were afterwards laid before the general afsembly of the ftate, which had the power of approving or rejecting, but not of altering them. For about 130 years the fenate maintained a juft equilibrium between the kings and the people; but the places of the fenators, as well as the authority of the kings being held for life, it was to be feared that, in time, thefe might too clofely unite, and no longer find any oppofition to their will. It was therefore deemed advifable, with the fuffrages of the Delphian oracle, to transfer a part of their functions to five magiftrates, called Ephori, or infpectors appointed to defend the people in cafe of oppreffion. This new intermediate body was inflituted, with the confent of the ftate, by the king Theopompus; or, if it had been originally eftablifhed by Lycurgus himfelf, it was revived, with fome additional powers and prerogatives, by Theopompus. (See EPHORI.) The conftitution of Lycurgus contained a happy mixture of monarchy, ariftoeracy, and democracy. Theopompus added to thefe an oligarchy which afterwards became tyrannical. Although Lycurgus limited the authority of the kings, he left them honours and prerogatives which they enjoyed as the heads of religion, the admiftration, and the army. Befides certain priefthoods, which were exercifed by themfelves, they regulated the public worfhip, and appeared at the head of the religious ceremonies. One of their prerogatives invelted them with the right of maintaining a fecret correffpondence with the priefts of Delphi, the authors of thofe oracles which often decided the fate of an empire; and this may be confidered as one of the

## LACEDÆMONIANS.

the most important privileges in the possession of royalty. As head of the state, the king, upon ascending the throne, might annul the debts which a citizen had contracted either with his predecessor, or with the republic; and he possessed certain portions of inheritances, assigned him by the people, which he might distribute during life in favour of his relations. The two kings presided in the senate, and proposed the subjects for deliberation. Each gave his suffrage in person or by proxy; and this single suffrage was equivalent to two. When the two kings agreed in proposing any project of manifest utility to the public, no person was permitted to oppose it. All causes relative to the maintenance of the highways, the formalities of adoption, or the choice of the kinsman who should be obliged to marry an orphan heiress, were submitted to the decision of the kings. The kings were not allowed to be absent during peace, nor both at once in time of war, unless there were two armies in the field. They had by right the command of the army, with such appendages of splendour and authority that might ensure them respect and obedience. The state provided for the maintenance of the general and his household, with the necessary attendants. Accordingly, he had full leisure to direct the operations of the campaign, to sign truces with the enemy, and to give audience and answers to the ambassadors of foreign powers. In time of peace the kings were considered merely as the first citizens of a free city; appearing in public without a retinue, and without ostentation. As first citizens they occupied the first place, and every person rose in their presence; and in all repairs, public and private, they were allowed a double portion, which they shared with their friends. When the kings died, they were honoured with various tokens of respect.

The senate, consisting of the two kings, and twenty-eight aged persons, were the supreme council, in which were discussed, in the first instance, all questions relative to declaring war, concluding peace, entering into alliances, and other high and important affairs of state. The dignity of a member of this council was never granted but to the citizen who, from his earliest youth, had been distinguished for consummate prudence and eminent virtues; nor could he arrive at it before the age of sixty years, and he retained it till his death. The election took place in the forum, where the people were assembled with the kings, senators, and the different classes of magistrates; and it was attended with various solemnities and acclamations. When it was decided, it was honoured with a kind of triumphal procession, and with ceremonies performed in the temples. Of the functions pertaining to the senator, some respected the state, and others related to particular cases, which were referred to the judgment of the members. On this tribunal depended not only the lives, but the honours of the citizens. When a king was accused of having violated the laws, or betrayed the interests of the state, the tribunal which acquitted or condemned him was composed of the twenty-eight senators, the five ephori, and the king of the other family. However, he might appeal from them to the general assembly of the people.

The ephori were elected by the people from among the citizens of every rank; they were five in number, and changed every year, to prevent their abusing their authority. (See EPHORI.) We shall here add, that the kings in their own name, and the ephori in the name of the people, engaged, by a solemn oath; the former to govern according to the laws, and the latter to defend the royal authority so long as it shall not violate the laws.

As the Spartans had interests peculiar to themselves, they had also others in common to them with the deputies of the different cities of Laconia. Hence there were two kinds of

assemblies, at which were always present the kings, the senate, and the different classes of the magistrates. When the succession to the throne was to be regulated, when magistrates were to be chosen or deposed, when sentence was to be pronounced on public crimes, or the great objects of religion or legislature were to be decided upon, the assembly was only composed of Spartans, and was called the "lesser assembly." The ordinary assembly of this kind was held every month; the extraordinary whenever circumstances required. Every one had a right to give his opinion, provided that he had passed his 30th year, for before that age he was not allowed to speak in public; and it was required also that his manners should be irreproachable. The general assembly was convoked whenever the question related to making war or peace, or contracting alliances. The deputies of the cities of Laconia were then admitted into it, as were also frequently those of the allied states, and of the nations who came to implore the succour of Lacedæmon. On occasions of this kind, the kings and senators frequently spoke, and their authority had great weight; but that of the ephori was greater. When the question had been sufficiently debated, one of the ephori asked the opinion of the assembly; upon which a multitude of voices exclaimed for the affirmative or negative. In order to determine the majority, the same magistrate ascertained it by numbering the two parties, which he caused to separate.

As a general preliminary to the laws of Lycurgus, we shall here observe, that this legislator ordained, that the magistrates should not be appointed by lot, but elected by suffrages. He deprived riches of the influence and respect annexed to them, and divested even love of jealousy. And though he granted some distinctions, the government, having imbibed his spirit, never prodigally lavished them, and virtuous men dared not solicit them. Honour was the most valuable reward, and reproach the most cruel punishment. Death was sometimes inflicted, but a sentence of this kind followed a very careful and rigorous examination, for nothing was regarded so precious as the life of a citizen. Execution was performed in the prison, and during the night, that the firmness of the criminal might not move the commiseration of the people, and his life was taken away by the cord, that the sufferings of the guilty might not be multiplied.

Of all the institutions of Lycurgus, the division of lands was that which required, on his part, the greatest degree of firmness and resolution, because it was likely to be much opposed, and to occasion various and violent contentions. He thought it, however, necessary for establishing peace and good order in the commonwealth. With a view of banishing from the community insolence, envy, fraud, luxury, and at the same time, extreme poverty and excessive wealth, he persuaded the citizens to surrender all their lands to the state, and to allow a new division of them, that they might live together in a perfect equality, and that virtue and merit should establish the only claim to pre-eminence and honours. This scheme was no sooner proposed than executed. The district of Sparta was divided into 900 portions of land, and the rest of Laconia into 30,000. Each portion assigned to a head of a family must have produced, besides a certain quantity of wine and oil, 70 measures of barley for himself, and 12 for his wife. This is Plutarch's account. Others say, that he only bestowed on the Spartans 6000 portions, to which king Polydorus is said afterwards to have added 3000. And others again say, that the Spartans received one half of these 9000 portions from Lycurgus, and the other half from Polydorus. After Lycurgus had made this distribution, he thought it advisable to absent himself, that the passions of the people might have leisure to subside and cool.

On his return, he found the fields of Laconia covered with clusters of sheaves, all of the same size, and placed at distances nearly equal. Accordingly he seemed to behold a large domain, the productions of which had been divided among brethren; while the Lacedæmonians believed they saw in him a father, who had manifested no more fondness for one than for the rest of his children. After having divided their immovables, he undertook likewise to make the same equal division of all their moveable goods and chattels, that he might utterly banish from among them every kind of inequality. But apprehending invincible opposition to this measure, he endeavoured to accomplish his object by sapping the foundations of avarice. With this view he cried down all gold and silver money, and ordained that no other should be current besides that of iron; which he made so heavy, and fixed at so low a rate, that a cart and two oxen were necessary to carry home a sum of 10 minas (equal to about 20*l.* sterling), and a whole chamber to keep it in. He next banished all useless and superfluous arts from Sparta. But without doing this, most of them must have sunk of themselves, and disappeared with the gold and silver money; because the tradesmen and artificers would have found no vent for their commodities; and this iron money had no currency among the other Grecian states, which so far from esteeming it, made it the subject of their banter and ridicule. The importation of all foreign money was prohibited, that corruption might not enter under the name of commerce. Barter or exchange of one commodity for another, was preferred by law in Sparta, long after it had been discontinued in every other state. Interest was also forbidden in the Spartan commonwealth. According to the laws of Lycurgus, the head of a family could neither buy nor sell a portion of land; he could neither give it during his life, nor bequeath it by will to whom he pleased. He was not even permitted to divide it. The eldest of his children was entitled to the inheritance, in the same manner as in the royal family, the eldest son succeeded by right to the crown. In order to provide for the other children, he established other regulations. The land, as well as the persons of the Spartans, were free from all impositions. The state had no treasure. On certain occasions the citizens contributed according to their abilities, and on others they had recourse to means which evince their excessive poverty. The deputies of Samos once came to Lacedæmon to solicit the loan of a sum of money. The assembly of the people, having no other resource, ordered a general fast to be observed by the free citizens, slaves, and domestic animals, and gave the sum thus saved to the Samians.

Another regulation of Lycurgus, was that of public meals. That he might entirely suppress the magnificence and extravagance of public tables, he ordained that all the citizens should eat together of the same common victuals, which the law prescribed, and expressly forbade all private eating at their own houses. By this settlement of public and common meals, and by this frugality and simplicity in eating, he depreciated the value of riches, and made them of no use as means of procuring the luxuries of life. This regulation, however, was very offensive to the opulent. At these meals, each table accommodated about 15 persons; and every person furnished every month a bushel of flour, eight measures of wine, five pounds of cheese, 2½ pounds of figs, and a small sum of money for preparing and cooking the victuals. Every person, without discrimination, was obliged to attend at the common meal. At these public tables the children obtained instruction and improvement; they were likewise trained and accustomed to great secrecy; for as soon as a young man came into the room, the eldest person of the company used to say to him, pointing to the door, "Nothing

spoken here, must ever go out there." The most exquisite of all their eatables was that which they called their "black broth;" and the old men preferred it to every thing else upon the table. Dionysius the tyrant, however, thought otherwise, and complained of it as insipid; upon which he was told that the seasoning was wanting. When the tyrant enquired, what seasoning? he was told, running, sweating, fatigue, hunger, and thirst. These, he was told, are the ingredients with which we season all our food. As they were moderate in their eating, they were no less abstemious in their drinking; the Lacedæmonians only drank to quench thirst; drunkenness was reckoned infamous among them, and severely punished; and that young men might conceive the greater abhorrence of this species of debauchery, the slaves were compelled to drink to excess, that the beastliness of the vice might appear. When they retired from the public meal, they were not allowed any torches or lights, because it was expected, that men who were perfectly sober, should be able to find their way in the dark; besides, this practice gave them a facility of marching without light, a quality very useful to them in time of war.

As to dress, there was no distinction between the rich and poor. Their garments were made for use and not for show; and they were taught betimes to distinguish themselves by their virtue, rather than by their robes. Boys were always used to go without shoes, nor were they permitted to cut or trim their hair. Baths and anointing were not much in use among the Lacedæmonians; the river Eurotas supplied the former, and exercise the latter. Young women wore their vests, or jerkins, only to their knees, or, as some say, not so low; a custom which has been censured both by Greeks and Romans as indecent. Gold, precious stones, and costly ornaments were permitted only to common women; which permission was the strongest prohibition to women of virtue, or such as valued their reputation. Virgins went abroad, without veils, with which, on the contrary, married women were always covered. In certain public exercises, to which girls were admitted, they, as well as the young men, were obliged to perform naked.

Lycurgus had very few written laws, because he did not wish to set bounds to virtues, and left the people, imagining they had done all which their duty required, should desist and not do all which they are able to perform. But he did not conceal them; they were transmitted from mouth to mouth, cited on all occasions, and known to all the citizens, the witnesses and judges of each individual. They were taught and enforced by practice and example. Young persons were not allowed to censure them, nor to submit them to examination, since they had been received as the commands of heaven, and since the authority of the laws was founded only on the profound veneration they inspired. Nor was it allowed to praise the laws and usages of other nations; because, unless the people were persuaded that they lived under the best legislation, they would soon be led to desire a new one. Indeed, obedience was, among the Spartans, the first of virtues.

Lycurgus considered the education of youth, in every stage of it, from the earliest infancy to maturity, as the most important object of a legislator's care. His grand principle was, that children belonged more to the state than to their parents; and therefore he ordered the state to be entrusted with the general care of their education, that they might be formed on constant and uniform principles, by which they might be inspired with the love of their country, and of virtue. As soon as a boy was born, the elders of each tribe visited him; and if they found him well made, strong and vigorous, they ordered him to be brought up at the public charge; but if, on the contrary, they found

him deformed, tender, and weakly, he was cast into a gulf near mount Taygetus. This law, it has been said, seems to have been calculated, in one respect, to render women very careful, when they were pregnant, of eating, drinking, or using exercise to excess; and it also seemed to make them excellent nurses, for which employment they were celebrated throughout Greece. At his earliest age the child was accustomed to the most hardy treatment in his food, dress, rest and general mode of life. He was to be used to solitude and darkness, and to be brought up a stranger to impressions of terror, useless restraints, and unjust reproaches. At the age of seven years his education according to the laws commenced, and he was trained up under the discipline appointed by the state. Education, indeed, in the whole course of it, was, properly speaking, an apprenticeship of obedience. While they were at table, the matter instructed the boys by asking them questions, to which they were to give a quick and concise, or laconic answer. Lyeurgus, it is said, was for having the money bulky and heavy, and of little value, but their language very pithy and short, comprising much sense in few words. To literature they paid little attention; for all the sciences were banished from the country. The principal objects of their study were obedience, the patient enduring of hardship and fatigue, and victory in battle. The superintendent of their education, was one of the most honourable men of the city, and of the first rank and erudition, or one of the ephori, who appointed over every class of boys, into which they were initiated, masters of the most approved wisdom and probity. Strict obedience, and great respect to their elders and superiors, were matters sedulously inculcated in the Spartan system of education. To the old men the youth rose up, whenever they came into any public place; when they met them in the streets they gave way; and they were silent, whenever their elders spoke. All the old men were deemed to have the authority of parents and warranted in the exercise of it; and thus Lyeurgus provided, that as youth are every where too apt to offend, they might be no where without a monitor. The laws went still farther; for if an old man was present when any youth committed a fault, and did not reprove him, he was punished equally with the delinquent. Amongst the youths there was one of their own body, or, at most, two years older than the rest, who was denominated "iren;" he had authority to question all their actions, to watch their behaviour, and to punish them if they did amiss; and their punishments were not slight, but severe. Silence was highly commended at Sparta, where modesty, not only in words and actions, but in looks and gestures, was held to be a most becoming virtue in young people. An inconsiderate person, who would not listen to instruction, and who seemed to disregard what the world might think or say of him, was treated by the Lacedæmonians as a disgrace to human nature.

Occupations among the Spartans that were necessary for the benefit of the community, such as agriculture and the like, were left to their slaves, the Helotes; but arts, subservient to luxury, were wholly interdicted. Thus orators or rhetoricians, augurs, bankers, and dealers in money were excluded. The Spartans admitted no theatrical diversions among them; but other kinds of poetry were allowed, provided the magistrates had the perusal of pieces, before they were introduced to the public. Music was much encouraged, provided that it was such as had been in favour with their ancestors; and they would not permit their slaves to learn either the air or the words of their most admired pieces.

Among the effects of ancient music, in softening the manners, promoting civilization, and humanizing men, naturally savage and barbarous, the most singular and striking

is related by Polybius, the historian, a grave, exact, and respectable writer, who, in speaking of several acts of cruelty and injustice exercised by the Ætolians, against their neighbours the Cynætheans, has the following remarkable passage, which we shall give at full length, from Mr. Hampton's excellent translation.

"With regard to the inhabitants of Cynætha, whose misfortunes we have just now mentioned, it is certain, that no people ever were esteemed so justly to deserve that cruel treatment to which they were exposed. And since the Arcadians, in general, have been always celebrated for their virtue throughout all Greece; and have obtained the highest fame, as well by their humane and hospitable disposition, as from their piety also towards the gods, and their veneration of all things sacred; it may perhaps be useful to enquire from whence it could arise, that the people of this single city, though confessed to be Arcadians, should, on the contrary, be noted for the savage roughness of their lives and manners, and distinguished by their wickedness and cruelty above all the Greeks. In my judgment then, this difference has happened from no other cause, than that the Cynætheans were the first and only people among the Arcadians, who threw away that institution, which their ancestors had established with the greatest wisdom, and with a nice regard to the natural genius, and peculiar disposition of the people of the country; I mean, the discipline and exercise of music: of that genuine and perfect music, which is useful indeed in every state, but absolutely necessary to the people of Arcadia. For we ought by no means to adopt the sentiment that is thrown out by Ephorus in the preface to his history, and which indeed is very unworthy of that writer, that music was invented to deceive and delude mankind. Nor can it be supposed, that the Lacedæmonians, and the ancient Cretans, were not influenced by some good reason, when, in the place of trumpets, they introduced the sound of flutes, and harmony of verse, to animate their soldiers in the time of battle: or that the first Arcadians acted without strong necessity, who, though their lives and manners, in all other points, were rigid and austere, incorporated this art into the very essence of their government; and obliged not their children only, but the young men likewise, till they had gained the age of thirty years, to persist in the constant study and practice of it. For all men know, that Arcadia is almost the only country, in which the children, even from their most tender age, are taught to sing in measure their songs and hymns, and that are composed in honour of their gods and heroes: and that afterwards, when they have learned the music of Timotheus and Philoxenus, they assemble once in every year in the public theatres, at the feast of Bacchus; and there dance, with emulation, to the sound of flutes, and celebrate, according to their proper age, the children those that are called the puerile, and the young men, the manly games. And even in their private feasts and meetings, they are never known to employ any hired bands of music for their entertainment; but each man is obliged himself to sing in turn. For though they may, without shame or censure, disown all knowledge of every other science, they dare not on the one hand dissemble or deny, that they are skilled in music, since the laws require, that every one should be instructed in it; nor can they, on the other hand, refuse to give some proofs of their skill when asked, because such refusal would be esteemed dishonourable. They are also taught to perform in order all the military steps and motions, to the sound of instruments: and this is likewise practised every year in the theatres, at the public charge, and in sight of all the citizens.

"Now to me it is clearly evident, that the ancients by no means introduced these customs, to be the instruments of

luxury and idle pleasure : but because they had considered with attention, both the painful and laborious course of life, to which the Arcadians were accustomed ; and the natural austerity also of their manners, derived to them from that cold and heavy air, which covered the greatest part of all their province. For men will be always found to be in some degree acclimated to the climate in which they live : nor can it be ascribed to any other cause, that in the several nations of the world, distinct and separated from each other, we behold so wide a difference, in complexion, features, manners, customs. The Arcadians, therefore, in order to smooth and soften that disposition, which was by nature so rough and stubborn, besides the customs above described, appointed frequent festivals and sacrifices, which both sexes were required to celebrate together ; the men with women, and the boys with virgins ; and, in general, established every institution, that could serve to render their rugged minds more gentle and compliant, and tame the fierceness of their manners. But the people of Cynætha, having slighted all these arts, though both their air and situation, the most inclement and unfavourable of any in Arcadia, made some such remedy more requisite to them than to the rest, were afterwards engaged continually in intestine tumults and contentions ; till they became at last so fierce and savage, that, among all the cities of Greece, there was none in which so many and so great enormities were ever known to be committed. To how deplorable a state this conduct had at last reduced them, and how much their manners were detested by the Arcadians, may be fully understood from that which happened to them, when they sent an embassy to Lacedæmon, after the time of a dreadful slaughter which had been made among them. For in every city of Arcadia, through which their deputies were obliged to pass, they were commanded by the public cry instantly to be gone. The Mantineans also expressed even still more strongly their abhorrence of them : for as soon as they were departed, they made a solemn purification of the place ; and carried their victims in procession round the city, and through all their territory.

“ This then may be sufficient to exempt the general customs of Arcadia from all censure ; and at the same time to remind the people of that province, that music was at first established in their government, not for the sake of vain pleasure and amusement, but for such solid purposes, as should engage them never to desert the practice of it. The Cynæthians also may perhaps draw some advantage from these reflections ; and, if the deity should hereafter bless them with better sentiments, may turn their minds towards such discipline, as may soften and improve their manners, and especially to music ; by which means alone, they can ever hope to be divested of that brutal fierceness, for which they have been so long distinguished.”

Though Polybius in this passage seems to attribute the happy change that was brought about in the manners of the Arcadians to music alone, it does not appear to merit all the honour, as a considerable part was doubtless due to the poetry that accompanied it ; which being grave, majestic, and full of piety and respect for the gods and heroes, whose glorious actions and benefits were celebrated in it, must have had great influence upon the minds of young persons, in whose education those two arts had so considerable a share.

Thucydides, as quoted by Aulus Gellius (lib. i. cap. 11.) says, when the Lacedæmonians went to battle, a Tibicen played soft and soothing music to temper their courage, left by an ardent temerity they should have rushed on with too great impetuosity ; for, in general, they had more need of having their courage repressed than excited.

However, in an engagement with the Messenians, they

were very near being discomfited, when the celebrated Tyræus, who performed the part of a Tibicen that day, finding the troops give way, immediately quitted the Lydian mode, and played in the Phrygian, which so reanimated their courage, repressed by the preceding mode, that they obtained a complete victory.

The Lacedæmonians, though a military people, of austere manners, appear at all times, notwithstanding their inhospitable law against the admission of strangers, to have invited eminent musicians into their country, and to have encouraged music ; not only in order to regulate the steps, and animate the courage of their troops, but to grace their festivals, and fill their hours of leisure in private life.

Athenæus tells us (lib. xiv.), that they had a flute painted on their ensigns and standards.

There was one kind of theft to which the boys were accustomed, and which was even authorized by the law, and by the consent of the citizens ; and this was their stealing herbs or roots from the gardens and public baths ; but if they were caught in the fact, they were punished for want of dexterity. The design of the Spartan legislator in allowing this practice, was to inspire the Spartan youth, who were all designed for war, with a view to self-defence, and not to extent of dominion, with boldness, subtlety, and address ; to ensure them betimes to the life of a soldier, to teach them to live upon a little, and to be able to shift for themselves. The patience and constancy of the Spartan youth were signally exemplified in Diana's festival, called “ Orthia,” which see. The most usual occupation of the Lacedæmonians was hunting, and other bodily exercises, to which they devoted in private and public much of their time and attention.

Hunting was made a part of the education of the Lacedæmonians, because it had a tendency to prevent corpulence, which incurred public contempt, if not banishment, and to strengthen their limbs, and to render those who practised it supple and fleet. They had a kind of public dances, in which they much delighted, common alike to virgins and young men. Indeed, in all their sports, girls were allowed to divert themselves with the other youths ; inasmuch that, at darting, throwing the quoit, pitching the bar, and the like robust diversions, the women were as dextrous as the men. For the manifest peculiarity of this custom, Lyeurgus assigned no other reason, than that he fought to render women, as well as men, strong and healthy, that their children might resemble them. The laborious life ceased with the age of 30 ; and they then employed themselves wholly either in affairs of state, or of war.

As to the laws relating to religion, they prescribed that the statues of all the gods and goddesses worshipped by the Spartans, should be represented armed, even Venus herself ; that the people might regard a military life the most noble and honourable, and not attribute, as other nations did, sloth and luxury to the gods. Their sacrifices consisted of things of small value ; that indigence might never hinder them from worshipping the gods. They were forbidden to make long or rash prayers to the heavenly powers, and were enjoined to ask no more, than that they might live honestly, and discharge their duty. Graves were allowed in their city, and they buried close to the temples, that all people might be familiar with death, and not conceive of it as a thing dreadful in itself, or that dead bodies defiled the living. Magnificent sepulchres were forbidden, nor was the plainest or most modest inscription permitted, except for such as were slain in the wars, or for women who had devoted themselves to a religious life. Tears, sighs, and outcries were not permitted in public, because they dishonoured Spartans, who ought to bear all things with equanimity. Mourning was restricted to seven days.

Celibacy in men was regarded as infamous, and punished

## LACEDÆMONIANS.

by various tokens of contempt. If a man did not marry when at full age, he was liable to an action; as those also were who married above or below themselves. Such as had three children had certain immunities, and those who had four were free from all taxes. Virgins were married without portions; husbands were allowed to beat their wives; and there were some other laws which we shall not here recite. The men of Sparta are generally said to have been distinguished for their virtue; but the Spartan women have been as generally decried for their boldness, and contempt of decency.

No Spartan was admitted to any concern in their judicial proceedings under 30 years of age; and it was held indecent, and in ill repute, for a man to busy himself at the tribunals, when he had no affairs there of his own. By these regulations, Lycurgus thought to prevent litigiousness, and that multiplicity of suits which are always fatal in a state. Persons of abandoned character lost all right of voting or speaking publicly on public affairs; for it was a perfusion among the Spartans, that a man of a base character in private life could not serve his country from motives of true patriotism.

At Sparta, it has been said, every thing tended to inspire the love of virtue, and the hatred of vice; the actions of the citizens, their conversations and mutual intercourse which frequently occurred, their public monuments, and their inscriptions. Accordingly Lycurgus would not allow all sorts of persons to travel, lest they should bring home foreign manners, and return infected with the licentious customs of other countries, and thus become averse from the life and maxims of Lacedæmon. On the other hand, he would suffer no stranger to remain in the city, who did not come thither to some useful or profitable end, or out of mere curiosity, lest they should disseminate the vices of their own countries. A soldier was the only reputable profession in Sparta; a mechanic or husbandman was looked upon with contempt. War, indeed, was the trade and business of the Lacedæmonians, and the first law of war with them was never to fly, or turn their backs upon their enemies, however superior in number; never to quit their post; never to deliver up their arms; in a word, either to conquer, or to die upon the spot. Hence it is, that a mother recommended to her son, who was going to make a campaign, that he should return either with or upon his shield; and that another, hearing that her son was killed in fighting for his country, answered very coldly, "I brought him into the world for no other end." A Spartan lady, having heard that her son had fled from a battle, wrote him this short letter, "Fame speaks ill of you; efface it, or be no more." In all expeditions, they were careful in the performance of religious rites; and after their evening meal, the soldiers sang together hymns to their gods. When they were about to engage, the king sacrificed to the Muses, that, by their assistance, they might be enabled to perform deeds worthy of being recorded to latest times. Then the army advanced in order to the sound of flutes, which played the hymn of Castor. The king himself sung the Pæan, which was the signal to charge. When their enemies began to fly they pursued no longer than till victory was ascertained; because they would seem to fight rather for the honour of conquering than of putting their enemies to death. After 40 years' service, a man was, by law, no longer required to go into the field, and consequently if the military age was 30, the Spartans were not held invalids till they were 70. It was one of the wisest maxims in the political system of Lycurgus, that he forbade the Spartans to fight often against the same enemy. They were forbidden to meddle with maritime affairs, though in process of time they were forbidden to transgress this inhibition.

It has been said that Lycurgus was the author of that

political expedient for lessening the number of slaves, or Helotes, in Sparta, called "Cryptia;" *i. e.* the ambuscade, when the slaves were thought too numerous. Such as had the care of educating the Spartan youth, selected the stoutest of them, and having armed them with daggers, sent them out to destroy their unhappy slaves, either by surprising them in the night, or falling upon them in the day, when they were at their work and defenceless. Plato condemns this law; and Plutarch denies that it was made by Lycurgus, whereas Aristotle expressly lays it to his charge; but when or however it was made, it was undoubtedly a cruel unnecessary expedient, in all respects unworthy of a virtuous people. The abbé Barthelemi (Trav. Anach. vol. iv. p. 481.) has, in our opinion, satisfactorily vindicated Lycurgus from the charge of having instituted such a practice. Plato himself recommends, that in a well governed state, the youth, as soon as they are of sufficient age, should, during two years, range the country with arms in their hands, braving the rigours of summer and winter, leading a hardy life, and subjected to a strict discipline. As the Cryptia was only practised among the Spartans, Plato has here described the nature of it. In this and another similar passage the object of the Cryptia is described, but not a word is said of the chase of the Helots; of which no mention occurs in any of the now remaining works of Aristotle, nor in those of Thucydides, Xenophon, Isocrates, and other writers of the same age, though they often speak of the revolts and desertions of the Helots, and occasionally censure the laws of Lycurgus, and the customs of the Lacedæmonians. The Abbé concludes, that till about the time when Plato wrote his treatise on laws, the Cryptia was not employed to shed the blood of the Helots. Afterwards, *i. e.* a short time after the death of Plato, the laws lost their force, and the Spartan youth killed those Helots who made too much resistance, and perhaps gave occasion to the decree of the ephori, which imported that the Helots might be murdered with impunity. The abuse increasing from day to day, the Cryptia was at length confounded with the chase of the Helots. According to Aristotle the Cryptia was instituted by Lycurgus. Plato explains its object and believes it to be extremely useful. When the manners of Sparta became corrupted, the youth of Lacedæmon, we are told, abused this exercise to perpetrate horrid cruelties, which cannot be justified, but which have been transmitted to us with exaggeration, and unjustly charged upon the institution of Lycurgus.

The institutions of Lycurgus have been much extolled both by ancients and moderns, but they are unquestionably liable to many objections. The legislator himself, when he framed them, must have been in a great degree devoid of that comprehension and sensibility of mind, which takes an enlarged view of the frame and condition of men, and which duly attends to the feelings of human nature; particularly those of parents and children. The understanding was left in a great degree uncultivated; decency was professed, barbarity rendered familiar; and all those tender sensations that humanize society were smothered, as it were, in the birth. The constitution was a most unnatural effect of speculation, founded upon the misery of the individuals that composed the community: for if the Spartans were free with respect to other nations, they were slaves to their own legislature. In a word, say the authors of the Universal History, it was a discipline calculated, not for a free people who had a right to cultivate the powers of reason, and taste the noblest enjoyments of life, but for the desperate militia of a despotic tyrant, who wants to extinguish every sentiment of humanity, and produce a contempt of life by stripping it of all its comforts.

## LACEDÆMONIANS.

Such an institution as that of Lycurgus, with all its defects and failings, is a just object of admiration: but it would have been less wonderful, if it had subsisted only during the life of the legislator; however, we know that it subsisted many ages after his decease in a greater or less degree of vigour and influence. Xenophon, in the encomium he has left us of Agesilaus, and Cicero, in one of his orations (Pro Flacc.,) observes, Lacedæmon was the only city in the world that preserved her discipline and laws for so considerable a term of years unaltered and inviolate. "Soli," (says Cicero, speaking of the Lacedæmonians), "motu orbe terrarum septingentos jam annos amplius unis moribus ad nunquam mutatis legibus vivunt." In Cicero's time, however, the discipline of Sparta, as well as her power, was very much relaxed and diminished. But all historians agree that it was maintained in a very considerable degree of vigour till the reign of Agis, under whom Lyfander, though himself incapable of being blinded or corrupted with gold, filled his country with luxury and the love of riches, by bringing into it immense sums of gold and silver, which were the fruits of his victories, and thereby subverting the laws of Lycurgus. But the introduction of gold and silver, says Rollin, was not the first wound given by the Lacedæmonians to the institution of the legislator. It was the consequence of a violation of another law still more fundamental: ambition was the vice that preceded and made way for avarice. The desire of conquests drew on that of riches, without which they could not have proposed to extend their dominions. The main design of Lycurgus, in the establishment of his laws, and especially of that which prohibited

the use of gold and silver, was, as Polybius and Plutarch have judiciously observed, to curb and restrain the ambition of his citizens, to disable them from making conquests, and in a manner to force them to confine themselves within the narrow bounds of their own country, without carrying their views and pretensions any farther. Indeed the government which he established was sufficient to defend the frontiers of Sparta, but was not calculated for raising her to a dominion over other cities. That it was not his design to make the Spartans conquerors is evident from his having expressly forbidden them, though they lived in a country surrounded with the sea, to meddle in maritime affairs; to have any fleets, or even to fight upon the sea. Although he made them a nation of foldiers and warriors, it was only that, under the shadow of their arms, they might live in liberty, moderation, justice, union, and peace, by being content with their own territories, without usurping those of others, and by being persuaded, that no city or state, any more than a single person, can ever hope for solid and lasting happiness, but from virtue only. On this subject, see Anc. Un. Hist. vol. v. Rollin's Anc. Hist. vol. ii. Travels of Anacharsis, vol. iv.

The stability, as well as the glory, of the Lacedæmonian government, was derived from the wise institutions of that celebrated lawgiver, of whose government we have given an account. After the death of Lycurgus, the Lacedæmonian history becomes perplexed, being supplied from scanty and scattered materials.

The following table shews the succession of their kings, in both lines, with the duration of their reigns, from Lycurgus until the Achæan league.

TABLE of the Lacedæmonian Kings.

Agidæ, or Family of Agis.				Proclidæ, or Family of Procles; called also Eurypontidæ.			
		Reigns.	Duration.			Reigns.	Duration.
	Beg.				Beg.		
Archelaus	-	-	60	Charilans	-	-	64
Teleclus	-	-	39	Nicander	-	-	30
Aleamenes	-	-	37	Theopompus	-	-	47
Polydorus	-	-	52	Zeuxidamus	-	-	33
Eurycrates	-	-	37	Anaxidamus	-	-	39
Anaxander	-	-	43	Archidamus	-	-	46
Eurycrates II.	-	-	37	Agasicles	-	-	41
Leon	-	-	44	Ariston	-	-	38
Anaxanórides	-	-	33	Demaratus	-	-	35
Cleomenes	-	-	39	Leotychides	-	-	22
Leonidas	-	-	12	Archidamus II.	-	-	42
Plitarchus	-	-	14	Agis II.	-	-	30
Plitooanax	-	-	58	Agesilaus II.	-	-	36
Pausanias	-	-	14	Archidamus III.	-	-	23
Agessipolis	-	-	14	Agis III.	-	-	9
Cleombrotus	-	-	9	Eudamidas I.	-	-	33
Agessipolis II.	-	-	1				
Cleomenes II.	-	-	61	Archidamus.			
Aretus, or Areus	-	-	44	Eudamidas II.			
Aerotatus	-	-	1				
Areus II.	-	-	7				
Leonidas II.	-	-	14	Agis IV.			
Cleombrotus	-	-	2				
Leonidas, restored	-	-	6	Archidamus.			
Cleomenes	-	-	16	Euclidas.			
Agessipolis	-	-		Lycurgus.			

Machanidas the Tyrant.

Nabis ditto 14

Alexamenus the Ætolian.

Lacedæmon becomes a part of the Achæan league, 191 B. C.

## LACEDÆMONIANS.

It would far exceed our limits to detail minutely the history of the Lacedæmonians during the series of reigns which we have above enumerated. We must content ourselves with marking some of its principal events, and particularly those in which their ambition led them to violate the constitution established by Lycurgus. We shall find that instead of employing their arms and exercising their valour for maintaining their own independence, they were actuated by an ambition for making conquests and extending their territories, by methods directly contrary to the rules of conduct which Lycurgus had prescribed. Charilaus, his nephew and pupil, began with an unsuccessful war with the Argives, and with the Tægentæ, a people of Arcadia; and he then turned his arms against the Achæans, who had taken from the Lacedæmonians several frontier towns, which he and his colleague Teleclus recovered. But a more important event in the Lacedæmonian history was the Messenian war, the foundation of which was laid during the reign, or soon after, the death of Teleclus; but it was actually commenced by Alcamenes, king of Sparta, who made a sudden irruption into the Messenian territory. In the prosecution of this war, the Lacedæmonians and their two kings took a solemn oath not to return till they had thoroughly reduced Messenia, by which oath they entered into an obligation to transgress two of the express laws of Lycurgus; one of which forbade them to make conquests, and the other which prohibited them from prolonging their war against the same people. Polydorus and Theopompus continued the war which had been begun by Alcamenes and Nicander; and constrained the Messenians to fortify a city which was situated on the top of the mountain Ithome, that they might retire into it for safety and self-defence, when they were driven from their other cities and villages, that were more exposed. The Lacedæmonians, regardless of that clause in the laws of Lycurgus, which cautioned them against besieging fortified places, laid siege to Ithome; and altogether destitute of experience in this branch of military tactics, they were under a necessity of continuing the siege for fourteen years before they reduced the place. It was during this expedition that Theopompus is said to have created the ephori, thus altering the original constitution of the Spartan government. The attention of the Spartans was diverted from the Messenian war by a dispute with the Argives, concerning the city of Thyrea, and its district, which, lying on the borders of Argolis and Laconia, occasioned great contentions between those states.

The Argives were defeated with great slaughter; but when Polydorus was urged to pursue his victory, and to attack Argos itself, he declined it with this noble declaration, worthy of the institution of Lycurgus, "that the Spartans sent him to assert their rights, but not to rob others." The Spartans, after having provided for the administration of affairs at home, by the appointment of the ephori, renewed the Messenian war, and marched with a great army towards Ithome, but they were defeated with great loss, and constrained to betake themselves to flight. At length, after an obstinate resistance on the part of the Messenians, they were obliged to surrender Ithome to the Spartans, and they themselves were treated with great rigour. The Spartans, during the Messenian war, having been ten years absent from the city, on account of their oath, which obliged them not to return till they had entirely subdued that country, were reminded by a message from the women, that, whilst they were so careful to subdue their enemies, they neglected the city. In consequence of this message, they decreed that the young men among them who came out of Sparta under age, and on this account were not obliged by the oath, should

return, and associating themselves promiscuously with the unmarried women, preferre the city from falling into decay. This project being executed, those who were born of such young women were called "Partheniæ;" that is, sons of virgins. When the Lacedæmonians returned, after having reduced Messenia, they neglected these young men, who, finding themselves involved in difficulties, for want of parents and an inheritance, intrigued with the Helotes, and formed a plot against the state. The plot, however, was discovered, and they were sent off to Italy, where they settled near Tarentum. In the reign of Anaxander and Anaxidamus, 685 years B. C., the second Messenian war begun, and continued 14 years. It terminated with the capture of Ira or Era, after a siege of 11 years, and by the conquest of Messenia, the inhabitants were made slaves, and the whole country was divided by the Spartans among their own citizens, the district of Methone excepted, which they gave to the Argives. Nothing of any great importance occurred in the history of the Lacedæmonians until the Persian war. When Miltiades, the Athenian, fought the famous battle of Marathon, and defeated the Persians, in the 490th year B. C., the Spartans had promised an army, but sent none; some time after the battle their troops arrived, contemplated the spot where it had been fought, and after having highly commended the Athenians, returned home again to Sparta. When this battle at Marathon excited the Persians to attempt again the conquest of Greece, the Spartans, with a resolution worthy of the disciples of Lycurgus, determined to oppose them. The states of Greece, apprized of the hostile intentions of Xerxes, unanimously joined in a general assembly to defend its liberty against the Persians; but in the event, of all the confederates, the Spartans and Athenians were the only states that seemed prepared to execute their purpose. A resolution was formed to defend the straits of Thermopylæ; and when 6000 foot were appointed for that service, the command of them was given to Leonidas, who had succeeded Cleomenes in the kingdom of Lacedæmon. Of the 6000 foot, 300 only were Spartans. Leonidas himself considered it as a desperate undertaking, but was determined either to succeed, or to die in the attempt. The issue of this conflict was the death of Leonidas with all his Spartans; but the victory on the part of the Persians cost them 20,000 men. The Grecian fleet, which lay at Artemisium, was entrusted to the command of Eurybides, a Spartan, possessed of great personal courage, but timorous as a commander, and unexperienced in maritime affairs. When Mardonius attempted the conquest of Greece, Pausanias, the son of Cleombrotus, who assumed the character of tutor or protector to Plistarchus, the son of Leonidas, had the command in chief of the whole Grecian army, which amounted to 100,000 men. The Persians were undoubtedly double this number. But both armies were afterwards greatly diminished by desertion. At length the Lacedæmonians and Tegetæans were forced to engage Mardonius's army without assistance. The Persians, it is acknowledged, behaved well on this occasion; but being neither so well armed, nor so well disciplined as the Greeks, their valour was of no use but to expose them to slaughter. The Persians were defeated and Mardonius killed. The Persian camp was forced; the Lacedæmonians opened a passage; and then a merciless slaughter ensued. Of 300,000 men, whom Mardonius brought into the field, scarcely 3000 escaped. The number of Greeks that fell is uncertain; Plutarch reckons them at 1360, but Diodorus Siculus affirms positively, that they were very few less than 10,000. On the same day in which the battle of Plataea was fought, (479 B. C.) Leotychides, king of Sparta, with Xanthip-  
pus,

## LACEDÆMONIANS.

pus, the Athenian, gained a glorious victory at Mycale, where the last remains of the Persian fleet, and of the Persian armies, which had been drawn together for the destruction of Greece, were utterly defeated, and Pausanias was afterwards sent to take the command of the fleet, with strict orders to free the Grecian cities from the Persian garrisons. But he soon after intrigued with Artabazus, and engaged in a scandalous treaty with the Persians; affecting, by the assistance of the great king, to make himself sovereign of Greece. The allies took umbrage at his conduct, and privately sent to accuse him at Sparta. He was induced, however, by delusion to return to Sparta; where he was seized by the ephori, but for want of sufficient evidence, or dreading his influence, they released him. He nevertheless pursued his negotiations with Artabazus, till his intrigues were discovered. Upon his retiring to the temple of Minerva Chalcedica, in order to take sanctuary there, the Spartans blocked up the gate, and thus preventing his escape, reduced him to the necessity of starving in the temple. At the end of the 77th olympiad (465 B.C.) a most dreadful earthquake happened at Sparta. Diodorus says, that 20,000 persons lost their lives, and Plutarch affirms, that only five houses in the city escaped ruin. In this year, 465 B.C., the third Messenian war commenced, by the instigation of the Iclotes, and lasted ten years. The next war which the Lacedæmonians undertook, was that styled the "Sacred," by some the "Phocian" war; begun in the 448th year B.C. The design of it was to put the temple of Delphi into the hands of the inhabitants of the country, whereas it had before belonged to the Phocians; this design the Spartans effected; and they were recompensed by a decree on the part of the Delphians, that they should have a right of first consulting the oracle; which decree was engraven on the forehead of a brazen wolf, consecrated in the temple. The Athenians soon after, having restored the temple to the Phocians, obtained the same privilege, and the decree which granted it was engraven on the right side of the wolf. The Lacedæmonians having induced the Boeotians to revolt from the Athenians, and Eubœa at the same time shaking off the yoke, availed themselves of this opportunity for giving a mortal blow to Athens; for which purpose Plistoanax was ordered to invade their territories, at the head of a great army. He was persuaded, however, by his guardian Cleonrides, who accepted a bribe from Pericles, to return home, without effecting any thing, for which corruption the Spartans punished Cleonrides with death, and sentenced their king to exile. Soon after a peace was made between the Spartans and Athenians. This peace was of no long duration; for in the year 431 B.C. the Peloponnesian war began. Archidamus, the king of Lacedæmon, wished to avoid this war, and sent a messenger to Athens, with a commission to this purpose; but he was sent back unheard. After several incursions into Attica, Archidamus died. He is said to have been one of the best kings that ever reigned in Sparta. Being asked, "who were governors of Sparta?" he replied, "the laws, and the magistrates according to these laws." During the reign of his son and successor Agis, who invaded Attica, the Athenians took several towns; but at length they were routed with great slaughter by the Spartans under the command of Brasidas, one of the most celebrated men of Sparta. In the year 421 B.C. a peace was concluded, after the war had raged for ten years. But in order to prevent too intimate an union between Sparta and Athens, several of the Peloponnesian states leagued themselves with Argos, which was a very powerful republic, and hostile at this time to the Lacedæmonians. After some flights and affronts, the Spartans, much irritated, resolved on a war

against them and their allies; and entered the territory of Argos with a large army. The Argives, being ill prepared for a conflict, declined it, and obtained from Agis a truce of four months; which gave great offence to his allies, and for which he was severely mulcted and opprobriously treated on his return to Sparta. The Athenians, having obtained a supply of troops, renounced the treaty made with Agis, and the two armies engaged at Mantinea. The Spartans under Agis, though inferior in number to the Argives and their allies, and very obstinately resisted, gained a complete victory. This happened in the year 418 B.C. In the year 414 B.C. Agis entered the territories of Elis, in order to revenge the dishonour that had been done some years before to the republic, by forbidding them to be present at the Olympic games. After repeated interruptions into the country, the Eleans treated with the Spartans, and a peace ensued. At this time the Peloponnesian war was renewed. The Athenians having sent a great army into Sicily, the Lacedæmonians sent Gylippus to assist the Syraculians; among whom he gained great reputation at first, though it was afterwards ruined by his avarice. About this time Alcibiades repaired to Sparta, having been expelled his country by a prevailing faction. By adopting the Spartan mode of living, he became a great favourite, and was treated with particular respect by Agis, who received him into his house; but in return for the hospitality he experienced, he basely debauched the wife of Agis, and was obliged to quit Læconia, and to seek among the barbarians a place of safety. Whilst king Agis managed the war in Attica, the conduct of maritime affairs was committed to Lyfander, who proved the great hero of Sparta, and brought to a termination the Peloponnesian war. Lyfander was supposed to be of the royal family, and of the Herculean race; he passed his younger years under all the restrictions of the institutes of Lycurgus, and was thus rendered bold, hardy, patient, and resolute; his genius was extensive, and in his disposition and manners, he was affable, modest, vigilant, and indefatigable; but with these great qualities he cherished the most dangerous ambition, in order to gratify which he stooped to every species of flattery and dissimulation; so that to accomplish his ends, he made no scruple to violate the most solemn oaths. When he entered on his command, he found the Athenians greatly superior at sea; but in a few years he deprived them of all power; but, above all things, he fought to advance his own credit and authority. Lyfander soon perceived, that without the Barbarian gold, Sparta could not carry on the war; and he therefore insinuated himself into the favour of Cyrus, who was then at Sardis, and obtained from him 10,000 pieces of silver, which he applied to the purpose of supporting his soldiers, and refitting his fleet. Whilst he lay at Ephesus, repairing his ships and keeping his soldiers and mariners to their exercise, he projected a scheme for making himself, in a manner, sovereign of Greece. After several previous manoeuvres and changes of position, he attacked the Athenians, whose fleet was under the command of Conon, both by sea and by land, and completely defeated and routed them; so that, in a single hour, he put an end to the Peloponnesian war, and to the maritime power of Athens. After this victory (405 B.C.), and the power acquired by it, Lyfander acted rather as an universal monarch than a general from Sparta. He immediately visited all the neighbouring cities, and changed their government, placing in each of them a Spartan magistrate, and with him ten of his friends from Ephesus, where he erected a kind of political university. These men conducted themselves with haughtiness and severity, and the Lacedæmonian government was thus rendered ungrateful; so that the people were univer-

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verfally difpofed to fhake it off as foon as they could. Lyfander collected the wealth which his victories had put into his power, and deftined it to be fent to Sparta, whither he had before fent a meffenger with the news of his victory over the Athenians, together with an affurance that he would foon be before Athens with a fleet of 200 fail; upon which, Agis and Pauſanias, the two kings of Sparta, were fent, with a very large land army, into Attica. Lyfander entered Athens in triumph, on the anniversary of the great victory at Salamis, April 24, in the year 404 B.C., which completely finiſhed the Peloponneſian war. (See ATHENS.) Lyfander, having accompliſhed this object, ſent the immense treaſures which he had collected to Sparta, under the care of Gylippus, whoſe avarice and fraudulent diſpoſition led him to open the bags which contained them, and to take out what he thought proper. Upon his arrival at Lacedæmon, their contents were examined, and compared with a ticket which Lyfander had put into each ſealed bag. The deficiency was ſoon diſcovered; Gylippus was impeached by his fervant, and his crime being proved, he was exiled under the ſcandalous imputation of being a detected cheat. This influx of wealth occaſioned great diſputes at Sparta: thoſe who were beſt acquainted with the nature of their conſtitution regarded the receipt of it as an open violation of the laws of Lycurgus, and they expreſſed their apprehenſion, that in proceſs of time they would have reaſon to repent this acceſſion of opulence. It was at laſt determined, as a compromise of the ſubſiſting diſputes, that the ſtate might make uſe of the gold and ſilver, but that private perſons ſhould poſſeſs neither, on pain of capital puniſhments. Lyfander, while he remained in Greece, amply evinced his imperious diſpoſition; ſetting up his own ſtatue, and thoſe of his commanders, who were his favourites, and dedicating two ſtars in honour of the deities Caſtor and Pollux, two ſtars which his ſycophants pretended had been ſeen in the rigging of his ſhip, at the battle of Ægos. The range of his ambition in Aſia was ſtill leſs reſtrained. At length the ephori and ſenate of Sparta diſpatched a *ſyſtala* (which ſee) to recall him. After ſome tokens of diſpleaſure, the Spartans became reconciled to him, and in proceſs of time extolled him for a man of integrity and true public ſpirit, to the mortification of their king Pauſanias, who had endeavoured to humble his pride and reſtrain his influence. Before Ageſilus was well ſettled on the throne (397 B.C.), the king of Perſia declared war againſt the Spartans: the king was, not without reaſon, jealous of the power of Lyfander; and a miſunderſtanding between them taking place, Lyfander reſolved to overturn the government of his country. But new diſturbances occurring in Greece, he perſuaded the ephori and ſenate once more to entruſt him with an army. An army was ſoon raiſed, to the command of which he was appointed; and another army was put under the command of king Pauſanias. Lyfander, haſtening by quick marches to Halartus, and unsupported by Pauſanias, who was more dilatory in his progreſs, was attacked by the Thebans and Halartians, and killed on the ſpot, and the Spartans were defeated. A treaty was concluded with Pauſanias, on condition of his retiring out of Bœotia. But on his return to Sparta, ſuch a ſpirit of reſentment appeared againſt him, that he was afraid to undergo his trial, and therefore retired to Tegææ, where he led a private life. The memory of Lyfander was held in great veneration, not only for the ſervices which he had rendered his country, but on account of his dying poor, notwithstanding the opportunities he had of enriching himſelf.

Ageſilus, having ſubjected the greateſt part of the coaſt, determined to march into Perſia, and revenge the cruelties

perpetrated by Xerxes, when he invaded Greece; but being recalled, he returned without heſitation; preferring his duty towards the conſtitution of his country to the proſpect of ſubduing the whole Perſian empire. During the reign and military exploits of Ageſilus (B.C. 393), Conon, the Athenian, threatened the Spartans with the loſs of their ſovereignty by ſea; upon which it was reſolved at Sparta to ſend Antalcidas into Perſia, to appeaſe the great king, and to detach him from the intereſts of their rivals. The negotiations of Antalcidas prevailed, ſo that a peace was concluded (387 B.C.), called the peace of Antalcidas, by which the ſovereignty of Greece was, in a manner, guaranteed to Sparta, but upon very diſhonourable terms, the Greek cities in Aſia being entirely abandoned to the Perſians, notwithstanding all the promiſes which had been made to them, and although Ageſilus himſelf had fought in their quarrel. The Lacedæmonians became haughty and inſolent, and reſolved to puniſh all who had injured them. They began with the Mantineans, who had been their confederates, and had done them great ſervices. They next extended their arbitrary power to the Phliſians, and then to the Olynthians, who were reduced to ſuch diſtreſs, that they made a treaty with the Spartans, by which they engaged to have the ſame friends and enemies with them, and to follow them as associates in their wars, whitherſoever they ſhould lead them. Sparta exerciſed a government that was arbitrary and cruel over all whom ſhe had brought moſt unjuſtly under her dominion; for, by the peace of Antalcidas, ſhe had engaged that all the cities ſhould be left free. The Perſian king perſiſted in his deſign to bring about a ſettled tranquillity, which, in the beginning of the 102d olympiad, (372 B.C.) ſeemed to be nearly effected; the Athenians heartily concurring with the Lacedæmonians, and giving no countenance to the Thebans, who reſuſed to hear of peace, becauſe the Spartans inſiſted they ſhould ſet the cities of Bœotia at liberty. In this oppoſition they were encouraged by Epaminondas, who demanded that, before the Lacedæmonians gave laws to others, they ſhould ſhew a proper regard to thoſe maxims of equity themſelves, by giving up Meſſenia to its ancient proprietors, and ſetting Laconia free. This obſtinity violently incenſed Sparta, and offended Athens. Cleombrotus, with an army of 12,000 men, penetrated into Bœotia, and advanced towards Leuctra. A truce, however, was concluded by the mediation of Jaſon, a powerful prince of Theſſaly. But as Cleombrotus was retiring, he met Archidamus, the ſon of Ageſilus, with a reinforcement from Sparta; and theſe princes, notwithstanding the truce, marched back to Leuctra, in order to fall on the Bœotians, where they found Epaminondas ready to receive them. The Spartans, in the battle of Leuctra, (fought July 8th, 371 B.C.) were defeated with great ſlaughter; and thus they loſt the empire of Greece, which they had held near 500 years. Epaminondas afterwards entered Laconia, and appeared before Sparta; but Ageſilus compelled him to retire, though not without deſolating the country in his retreat. Epaminondas, when he quitted the territories of Sparta, rebuilt the city of Meſſene, and recalled the ancient inhabitants of Meſſenia from the ſeveral countries where they had taken refuge, and reſtored them to the poſſeſſion of their ancient patrimony, after they had loſt it 300 years. Having accompliſhed this object, he offered the Lacedæmonians peace, on condition that they ſurrendered all pretenſions to Meſſenia, and left Laconia free; terms which they rejected with diſdain. At length the Perſian king diſpoſed almoſt all Greece to think of peace; and this was effected, after the Laconian or Bœotic war had laſted about five years. In the ſecond year

of the 104th olympiad (363 B. C.) new commotions arose in Peloponnesus. Epaminondas made an unsuccessful attempt to surprize Sparta, and afterwards Mantinea; mortified by these disappointments, he determined to attack Agesilaus, who was at the head of the Lacedæmonians and Arcadians, with the rest of their allies; but in his charge against the Lacedæmonians, he exposed his person too much, and fell under a cloud of darts, and was at length killed by a Spartan javelin. Pyrrhus of Macedon, interfering in a dispute about the succession to the throne of Sparta, made several attempts against the city, but was as often repulsed; and before he quitted Greece he was killed in a battle with Areus the Spartan king. Cleonidas II., who succeeded Areus II. in the year 257 B. C. had long lived in the court of Seleucus, and acquired a taste for pomp and grandeur. At Sparta he had an opportunity of indulging this taste, for the maxims of Lycurgus had sunk not only into disuse, but into contempt. One of the ephori, who had gained influence, and who had conceived a prejudice against his own son, procured a law, by which all men were left at liberty to dispose of their lands by gift or sale, or by testament at the time of their decease. In consequence of this law, which subverted the original constitution, most of the lands were, by degrees, transferred from the ancient Spartan families; and thus the credit and glory of the Spartan state declined. Agis, the colleague of Leonidas, and a perfect counterpart to him in disposition and character, attempted to counteract his conduct, and to restore the constitution of Sparta. Cleombrotus, who succeeded Leonidas, after he had been set aside, concurred with Agis in all his designs; but when Agis was obliged to go with a body of Spartan troops to the assistance of the Achæans, his colleague abused his power to such a degree, that Leonidas was restored; upon which Agis, when he returned, fled to the temple of Minerva, and could not be drawn out of his sanctuary by any methods which Leonidas could practise. He was at length treacherously seized, tried, and condemned by the ephori, and at last put to death. On the death of Leonidas, Cleomenes ascended the Spartan throne; and resolved to suppress the ephori, and to restore the ancient constitution of Sparta. In the course of his reign he invaded Achæa, and took several cities. Being informed that Areus and the Achæans were preparing to give him disturbance, he marched a body of troops into their territories, and gained many advantages over them. At length the Achæans, disheartened by their ill success, offered to submit to any terms which Cleomenes proposed. He acted like a generous victor, declaring that he merely fought to be acknowledged general of the Greeks, and that he was ready to deliver up the prisoners without ransom, and to restore the cities he had taken. But being seized with a disorder, which induced for a time a disability for service, Areus suffered jealousy, envy, and self-conceit to triumph over his virtue and love for his country; and he, who in his youth had expelled the Macedonians out of Peloponnesus, merely from the love of freedom, now privately recalled them, fearing that Cleomenes, the most worthy of the Spartan kings, should be raised to that dignity which he so highly merited. When Cleomenes recovered from his disorder, he advanced towards Argos, where the Achæans held their assembly; but when he drew near, Areus sent to inform him, that he must either enter the city alone, or he content to treat without the place. Cleomenes, in consequence of this treatment, invaded Achæa, and took several cities. He soon after surprized Argos, and advanced himself to greater power than any of his predecessors had possessed; and his city to greater pre-eminence than he had ever held in Greece. At a subsequent period, viz. in the

year 222 B. C. he gave battle to Antigonus at Sallafia, where, from the superiority of the Macedonian troops, and the treachery of Damoteles, the Lacedæmonians were defeated with a great slaughter of their mercenary troops, and an almost total destruction of their own. After this disastrous defeat, Cleomenes fled to Egypt, where he put an end to his life. With him terminated the Herculean race of Spartan kings, if we except the short reign of Agesipolis. After the fatal battle of Sallafia, Sparta fell into the hands of king Antigonus, who treated the inhabitants with great kindness, and they for a time behaved very quietly. Lycurgus, the Spartan king, invaded Messenia, and defeated the Messenians. After he had obliged Philip of Macedon to retire from Laconia, the ephori, pretending to have received information that he wanted to make himself absolute, attempted to surprize and murder him; but he withdrew into Æolia, and when the iniquity of the ephori was discovered by the people, he was recalled. Machanidas, the successor of Lycurgus, ejected the ephori, averfe from having any either equal to, or greater than, himself in Sparta. Abroad, he made all Peloponnesus tremble, and would probably have subdued it, if Philopœmen, the chief of the Achæans, had not opposed his designs. This leader engaged all the cities in that league to furnish troops for reducing the power of Machanidas; an engagement took place between the contending parties at Mantinea, in which the Spartans were defeated, and Machanidas was killed. Nabis, a cruel tyrant, succeeded Machanidas; and upon his death, by the hand of violence, the chief of the Ætolians broke into his palace at Sparta, and rifled all his treasures. The soldiers followed his example, so that the Lacedæmonians, who had suffered so much from the wanton and savage tyranny of Nabis, looked upon his murder as their misfortune; and a multitude of them assembled, and put many of the Ætolians to death without mercy. In the midst of their confusion, Philopœmen arrived, and having convinced the Lacedæmonians of the madness of their act, engaged them, since they had so happily recovered their freedom, to unite themselves to the Achæans, B. C. 197. (See Achæans.) In the year 188 B. C. upon a quarrel between the Lacedæmonians and Achæans, Philopœmen destroyed the walls of Lacedæmon, abrogated the laws of Lycurgus, and compelled the Spartans to adopt those of the Achæans. Upon their preferring a complaint to the senate of Rome, Callicrates ordered the walls of their city to be re-built; and according to the opinion of Meursius, which is the most probable, the laws of Lycurgus were not restored till after the Romans had vanquished Perseus, and Achæa was joined to their empire. Lacedæmon was placed under the protection of the Romans. During the civil wars of the Roman empire, the Lacedæmonians attached themselves to the party of Cæsar and Augustus, to whom they consecrated temples. Nero, in his expedition into Greece, durst not enter Sparta, by reason of the severity of its laws. Pliny the elder speaks of Lacedæmon as a free city under Vespasian. Apollonius Tyaneus, if we may credit Philostratus, found the laws of Lycurgus in full vigour in the time of Domitian; but it is probable, that this emperor diminished the liberty of the Lacedæmonians, for Pliny the younger, writing under the reign of Trajan, says, that there only remained the shadow of liberty. From that time no vestige remains of the institutions of Lycurgus; at least Meursius could not discover any. When Christianity became the religion of the empire, the residue, if any, of these institutions must have been abolished. Meursius cites a passage from Theodoret, which proves that they were entirely abolished by the Romans before his time, that is, before the 5th century.

Although, in the preceding article, we have used the appellation

pellations Lacedæmonians and Spartans as synonymous; yet when they are distinguished, the Spartans denote the citizens of Sparta, and the Lacedæmonians are the inhabitants of the province. The number of the former anciently amounted to 10,000. In the time of XERXES their number was 8000; but by their continued wars they were so much reduced, that very few ancient families were found at Sparta. The new families were descended from the Helots, or slaves, who, being first rewarded with their liberty, afterwards acquired the title of citizens. These were not called Spartans, but were differently denominated according to the various privileges they had obtained, and their several names bore some reference to their former condition. The Lacedæmonians, properly so called, formed a confederation, the object of which was to unite their forces in war, and to maintain their rights in time of peace. When the interests of the whole state were to be discussed, they sent their deputies to the general assembly, which was always held at Sparta. There were settled the contributions which each city should pay, and the number of troops it should furnish. The inhabitants of the cities of Laconia did not receive the same education with those of the capital. Their manners were more rude, and their courage less brilliant; and hence Sparta obtained an ascendancy over the other cities. *Anc. Univ. Hist. vol. v. Rollin's Anc. Hist. vol. ii. Trav. of Anacharisis, vol. iv.*

**LACEDÆMONIUM MARMOR**, in the *Natural History of the Ancients*, the name of a species of marble very hard, and of a beautiful green colour; it is a very close, even, and compact marble; of a fine strong and bright green, and when polished, is the brightest of all the green marbles, and is remarkable for this, that the colour is not regularly and equally diffused through the whole mass, but leaves in it many spots and lines very bright and pale, and some much deeper than the general colour, though there is no colour but green in the whole, only in different shades and degrees, some parts approaching to black, and others to whiteness.

It was originally found only in Egypt, and there not in entire strata, but in large pieces washed off from the strata, and sometimes left on the surface, sometimes buried in the earth, and was greatly valued. It has been since found in Italy and Germany, and in England. About five miles from the Hot-Wells at Brillol there is a stratum of it, whence it might be had in considerable quantities. Its beauty would soon recommend it, if it were once known; and though hard to cut, it would make amends for that by the high polish it would take.

**LACERATED WOUNDS.** See **WOUNDS**.

**LACERNA**, a thick coarse sort of military garment worn by the ancients.

The lacerna was a kind of cloak of woollen, only used by the men; who wore it over the toga, and when that was not on, over the tunica. It was at first very short, but growing popular in the Roman army, it was soon lengthened.

The lacerna was scarcely known in Rome till the time of the civil wars, and the triumvirate; then indeed it came into fashion; for the soldiers being then frequently in the city, or at the city gates, the sight became familiar to the citizens, and they fell into the use of it; inasmuch that it became the common dress of the knights and senators, till the time of Valentinian and Theodosius, when the senators were prohibited the wearing of it in the city.

The lacerna appears to have been much the same with the *elblamy* and *birrus*.

Martial mentions lacernæ of ten thousand sesterces price.

**LACERTA**, **LIZARD**, in *Astronomy*, a constellation of the northern hemisphere, including, according to Hevelius,

ten stars, and in the British Catalogue sixteen. See **CONSTELLATION**.

**LACERTA**, in *Zoology*. See **LIZARD**.

**LACERTI**, a division of the reptiles, comprehended under the genus of *Lacerta*.

**LACERTUS**, and **LACERTULUS**, in *Anatomy*, names sometimes applied to the bundles of fibres, of which the muscular organs are composed.

**LACERTUS**, in *Zoology*. See **MANIS**.

**LACERTUS**, in *Ichthyography*, the lizard-fish, a name given by some writers to a fish of the cuculus kind, much resembling the common mackerel in shape and in taste, and more usually called trachurus.

**LACERTUS** is also used for a fish of the gar-fish kind, or *acus Oppiani*, but larger than the common species, and called by the Italian fishermen *aguglia imperiale*, or the imperial gar-fish, and by the fishermen of England, particularly in Cornwall, the *gerrack*, in distinction from the common kind which they call *kipper*. It is thicker in proportion to its length than the common gar-fish, and has a shorter and sharper snout, and instead of teeth, has only its jaws serrated like a file. It is a fierce fish, but is more firm in its flesh than the common gar-fish. See **ESOX**.

**LACERUM**, in *Anatomy*, an epithet applied, from their irregular figures, to two foramina of the skull; one in the orbit, the other in the basis crani. See **CRANIUM**.

**LACERUM FOLIUM**, among *Botanists*. See **LEAF**.

**LACHAS**, in *Geography*, a town of South America, in the audience of Quito; 60 miles N. of Quito.

**LACHELA**, a town of Sweden, in East Bothnia; 13 miles S.S.E. of Wafa.

**LACHELLO**, a town of France, in the department of the Sèna; nine miles W.S.W. of Verceili.

**LACHEN**, a town of Switzerland, in the canton of Schwetz, on the S. side of the lake of Zurich. Near it are some mineral springs, and also crystals and petrifications; eight miles W. of Utznach.

**LACHENALIA**, in *Botany*, so named by professor Jacquin, jun. in honour of Werner de Lachenal, professor of botany and anatomy at Basil, a distinguished pupil of Haller and friend of Linnæus, eminent for his knowledge of European plants, and still more estimable for his candour and liberality. Several of his dissertations occur in the *Acta Helvetica*, which throw great light upon the botany of Switzerland, and were intended as preparatory to a *Flora* of that country, disposed according to the Linnæan system; but this work has never yet appeared. Whether its author be still living, we have not lately heard. He was born in 1730.—Jacq. fil. in *Act. Nov. Helvet. v. 1. 38. t. 2. f. 3.* Murr. in *Linn. Syst. Veg. ed. 14. 314.* Schreb. 799. Willd. *Sp. Pl. v. 2. 171.* Mart. *Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 284.* Lamarck. *Dict. v. 3. 372.* *Illustr. f. 1. t. 237.* (Phormium; *Juss. 52.*)

*Gen. Ch. Cal. none. Cor. of six oblong unequal petals, approximated into the form of a tube, united at their base; the three outer ones shortest, and often callous at the tip. Stam. Filaments six, erect, awl-shaped, attached to the base of the petals, various in length; anthers erect, oblong. Pisl. Germen superior, nearly ovate; style awl-shaped, as long as the stamens; stigma simple, obtuse. Peric. Capsule nearly ovate, with three wings, and three cells. Seeds several, globose, attached to the central column.*

*Ess. Ch. Corolla inferior, regular, of six petals; the three inner ones longest. Stamens erect. Capsule somewhat ovate, with three wings. Seeds globose.*

*Obs. Jussieu and Lamarck, following the younger Linnæus in his Supplementum, confound this genus with the*

## LACHENALIA.

*Phormium* of Forster, or New Zealand flax, the former retaining this name, while the latter adopts that given by Jacquin as above; but these genera are no less distinct in habit than in their essential characters. See PHORMIUM.

The species of *Lachenalia* are beautiful bulbous plants, with the habit of a Hyacinth, having all radical oblong leaves, a simple racemose flower-stalk, and variously-coloured, more or less spreading or drooping flowers. Willdenow has 24 species; the 2d edition of *Hort. Kew.* enumerates 17 as cultivated in that noble collection; but we would presume to remove two species from both these lists. *L. fruticosa*, which is *Hyacinthus serotinus* of Linnaeus, a native of Spain, figured in *Curt. Mag.* t. 859 and t. 1185, is referred by Mr. Ker, in the last-mentioned work, to *Scilla*, a measure to which we cannot but readily accede; and *L. viridula* may as well, in our opinion, continue in *Hyacinthus*, where Linnaeus has placed it; at least it cannot well be made to agree with *Lachenalia*; see *Jacq. Ic. Rar.* t. 66. The remaining species are all natives of the Cape of Good Hope, and, as far as we know, of no other part of the world. Such as we have in gardens are cultivated in the green-house, being treated like other Cape bulbs, and flowering chiefly in the early spring, a few of them in autumn. Good examples of this genus are,

*L. orchisoides*. Orchis-like *Lachenalia*. *Jacq. Ic. Rar.* t. 390. *Curt. Mag.* t. 854. 1269.—Flowers bell-shaped, sessile. Inner petals obtuse, expanding. Style the length of the stamens. Leaves oblong-lanceolate, with a crenate cartilaginous edge.—This is the oldest inhabitant of the English gardens among the whole genus, having been cultivated by Miller in 1752. It appears to be a very variable species, at least if more than one be not confounded under this name. The leaves are more or less speckled, like the flax. Flowers numerous, varying with pale yellow or purple mingling into shades of brown.

*L. contaminata*. Mixed-coloured *Lachenalia*. *Curt. Mag.* t. 1401. (*L. hyacinthoides*; *Jacq. Ic. Rar.* t. 382. Willd. n. 4. *L. orelioides*; *Jacq. Hort. Vind.* v. 2. 83. t. 178.)—Flowers bell-shaped, somewhat cylindrical, on short stalks, erect. Inner petals lanceolate, obtuse, erect. Leaves linear-awl-shaped, channelled, lax, longer than the stalk.—This has long been at Kew, having been sent from the Cape, by Mr. Masson, in 1774. The long taper-pointed leaves, deeply-spotted stalk, and speckled flowers, in which white, brownish purple, and tints of green, contend for the superiority; but the two former generally prevail, characterize this species.—Nearly akin to it is *L. angustifolia*, *Jacq. Ic. Rar.* t. 381. *Curt. Mag.* t. 735. Redout. *Liliac.* t. 162; chiefly distinguished, according to Mr. Ker, by the broader proportion and spreading posture of the inner petals. The leaves also are narrower, but the whole habit and colours of the plant are very similar.

*L. orbiculata*. Straight-petalled *Lachenalia*. *Jacq. Coll.* v. 3. 240. *Ic. Rar.* t. 383.—Flowers cylindrical, slightly funnel-shaped, on short stalks, erect. Petals all lanceolate, straight. Bractæes cup-shaped. Leaves linear-awl-shaped, channelled, lax, longer than the stalk.—Of this we have seen no specimens, but Jacquin's figure proves it abundantly distinct from the *contaminata*, with which, as Mr. Ker observes, it has been confounded by Willdenow and in the *Hortus Kewensis*. The petals are white, with a green spot at the base, near the point of each. The above character expresses their form and position.

*L. pusillula*. Blistered *Lachenalia*. *Jacq. Coll.* v. 3. 244. v. 4. 220. t. 2. f. 5. *Ic. Rar.* t. 386. *Curt. Mag.* t. 817.—Flowers bell-shaped, somewhat cylindrical, on very short stalks. Inner petals dilated and obtuse. Stalk triangular,

reclining. Leaves two, lanceolate, blistered.—The leaves are remarkable for their blistered upper surface. The flowers are pallid and unornamented; their inner petals, at first cream-coloured and spreading, become twisted together and yellowish in decay.

*L. purpurascens*. Purple-blue *Lachenalia*.—*Jacq. Ic. Rar.* t. 388. *Curt. Mag.* t. 745; *Andr. Repof.* t. 251.—Flowers bell-shaped, stalked. Inner petals obtuse, revolute. Stamens prominent. Stalk angular above. Leaves two, lanceolate, blistered.—One of the more handsome kinds, conspicuous for its copious flowers, which are variegated with blue and purple, and smell like hawthorn. Their colours and expanded form give them a resemblance to some species of *Scilla*. The leaves are short and broadish, occasionally destitute of blisters.

*L. lanceolata*. Spotted copperas-leaved *Lachenalia*.—*Jacq. Ic. Rar.* t. 402. *Curt. Mag.* t. 643. Redout. *Liliac.* t. 59.—Flowers somewhat bell-shaped, spreading, on stalks thrice their own length. Petals linear, blunt, nearly equal. Leaves numerous, ovate, pointed.—Chiefly remarkable for its numerous, broad, taper-pointed leaves, spreading in the form of a star, of a glaucous hue, more or less speckled with a darker green. The flowers are numerous, pendulous, variegated with dull purple and green.

*L. tricolor*. Broad-leaved three-coloured *Lachenalia*.—Murray in *Lin. Syst. Ved.* ed. 14. 314. Redout. *Liliac.* t. 2. *Curt. Mag.* t. 82. (*L. luteola*; *Jacq. Ic. Rar.* t. 395. *Phormium aloides*; *Lin. Suppl.* 105.)

♀. *luteola*; *Curt. Mag.* t. 1020. (*L. flava*, *Andr. Repof.* t. 456.)

γ. quadricolor; (*L. quadricolor*; *Curt. Mag.* t. 588 and 1097. *Jacq. Ic. Rar.* t. 390. *Andr. Repof.* t. 148. *L. tricolor*; *Jacq. Ic. Rar.* t. 61. *L. pendula* β; Willd. *Sp. Pl.* v. 2. 181.)

Flowers cylindrical, pendulous, stalked. Inner petals twice the length of the outer, dilated, slightly spreading, somewhat emarginate. Bractæes taper-pointed. Leaves two, lanceolate.—This is one of the most common and generally cultivated species. We are so well satisfied of the truth of Mr. Ker's remark, that the *quadricolor* of the above authors, referred by some to the *pendula*, is most akin to *tricolor*, that we cannot consider it otherwise than as a variety, certainly not more specifically distinct than the *luteola*. We conceive therefore that either these three plants must constitute one species, or they ought all to be considered as alike distinct. Cultivation by seed must in time decide this question. The leaves in all of them are in pairs, and recurved; those of the first are broad and spotted; the others longer and narrower, generally without spots. Spike in all somewhat comose, many of the uppermost flowers being abortive, and their pointed bractæes crowded into a tuft. The outer petals of all are tipped with green; those of the first and third varieties more or less tinged with red, those of the second plain yellow. The inner petals of the first are variegated with green and pale yellow; those of the second are of a plain full yellow, being moreover rather broader and more expanded; those of the third are lemon-coloured, elegantly tipped with deep crimson or purple.

*L. rubida*. Dotted-flowered *Lachenalia*. *Jacq. Ic. Rar.* t. 398. *Curt. Mag.* t. 903.

♀. *tigrina*; *Jacq. Ic. Rar.* t. 399.

γ. punctata; *ibid.* t. 307.

Flowers cylindrical, drooping, on short stalks. Inner petals one-fourth longer than the outer, spatulate, somewhat unequal, obtuse. Bractæes scarcely pointed. Leaves two, elliptic-oblong.—This is said to be rather rare in our collec-

tions. The leaves and stalk are speckled with purple, and the flowers dotted with red, in all the three varieties, which have no pretensions to be reckoned species. They differ only in luxuriance, *virgata* being the strongest plant, *punctata* the weakest and most slender.

*L. pendula*. Four-coloured Pendulous Lachenalia.—Ait. Hort. Kew. ed. 1. v. 1. 461. Jacq. Coll. v. 3. 239. 12. Rar. t. 400. Curt. Mag. t. 590. Andr. Repof. t. 41. Redout. Liliac. t. 52.

Flowers cylindrical, pendulous, on very short stalks. Inner petals nearly one-fourth longer than the outer, wedge-shaped, obtuse. Bractees scarcely pointed. Leaves two, obovate-lanceolate.—One of the most commonly cultivated and most beautiful species, flowering in the green-house or frame in February. The leaves are broad. Flowers numerous, drooping and somewhat curved, of a fine red at their base, their segments tipped with various degrees of purple and green, the middle part yell-w. The main stalk is stout and straight, speckled; the partial ones very short.—Willdenow makes the *quadricolor* a variety of this, in which he is inadvertently copied by the editors of the second edition of *Hort. Kew.*; an error corrected by Mr. Ker in *Curt. Mag.* v. 26. p. 1020. See also v. 16. p. 588, of the same work.

LACHENALIA, in Gardening, comprises plants of the bulbous-rooted kinds, of which the species mostly cultivated are the spotted-leaved lachenalia, *L. orchioidea*, the pale-flowered lachenalia, *L. pallida*, the three-coloured lachenalia, *L. tricolor*.

The third sort varies with yellow, saffron-coloured, blood-red purple at the tip, and greenish-yellow corollas; also in the proportion between the inner and outer petals; and in the breadth of the leaves.

*Method of Culture*.—All these plants may be increased by cffsets from the bulbs, and by seeds, when they are produced in perfection.

The cffsets should be planted out in pots of light fresh earth, when the bulbs are in a state of inactivity of growth, placing them in a warm border to be covered with hand-glasses, or, what is better, in a dry stove or green-house.

These plants bear forcing tolerably, and their flowering is much promoted by being preserved in the warmth of the stove.

They all afford variety among collections of potted bulbous-rooted flowering plants.

LACHES, from the French *lacher*, i. e. *laxare*, or *lache*, *ignavus*, in our *Lacus*, signifies slackness or negligence; as it appears in Littleton, where laches of entry is a neglect in the heir to enter, and probably it may be an old English word: for when we say there is laches of entry, it is the same as if it were said, there is lack of entry; and in this signification it is used. (Litt. 136.) No laches shall be adjudged in the heir within the age; and regularly laches shall not bar either infants or femes covert for non entry or claim to avoid d. scents: but laches shall be accounted in them, for non performance of a condition annexed to the state of the land. (Co. Litt. 146.) The law also determines, that in the king there can be no negligence, or laches; and therefore no delay will bar his right. Co. Litt. 90.

LACHESIS, in Zoology. See COLUBER.

LACHEZE, in Geography. See LA CHAISE.

LACHESH, in Scripture Geography, a town of Palestine, in the tribe of Dan, S.W. of that of Judah, on the frontiers of this tribe, to which Senacherib laid siege, when he sent his haughty message to Hezekiah. It was a small town,

or village, about 7 miles S. from Eleutheropolis, in the time of Eusebius and Jerom. Joh. x. 23. xv. 39. 2 Kings, xviii. 17. xix. 8. 2 Chron. xxiii. 9.

LACHNÆA, in Botany, from *λαχνη*, soft hair or down, alluding to the fine hairy clothing of the corolla. The name seems to have been given by the elder Van Royen.—Linn. Gen. 194. Schreb. 261. Willd. Sp. Pl. v. 2. 434. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 415. Juss. 77. Lamarek. Illust. t. 202. Class and order, *Orchandiæ Monogynia*. Nat. Ord. *Vespetulæ*, Linn. *Thymelææ*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, coloured, permanent; tube long and slender; limb in four deep unequal segments, the uppermost of which is much the smallest and erect, the other three reflexed, the middle one largest. Cor. none. Stam. Filaments eight, bristly-shaped, erect, inserted into the upper part of the tube, and nearly as long as the limb; a little unequal; anthers simple, roundish. Pist. Germen superior, ovate; style thread-shaped, longer than the tube, attached laterally to the germen; stigma capitate, hispid. Peric. none, except the permanent base of the calyx. Seed solitary, coated, ovate, with an oblique point.

Eff. Ch. Calyx tubular, coloured, with a four-cleft unequal limb. Stamens inserted into the mouth of the tube, permanent. Seed one, coated.

Obs. This genus differs from *Passerina* in having an irregular flower only. We follow Linnæus in his *Gen. Pl.* as to the denomination of the parts of the flower, though in his *Syst. Veg.* he subsequently termed corolla what he had before called calyx; but the analogy of *Daphne* compared with *Gnidia*, (see those articles), confirms his original phraseology.

1. *L. erioccephala*. Woolly-headed Lachnæa. Linn. Sp. Pl. 514. Andr. Repof. t. 104. Curt. Mag. t. 1295. (*Passerina erioccephala* and *cephalophora*; Thunb. Prod. 75.)

—Leaves opposite, imbricated in four rows, pointless, keeled underneath. Flowers woolly; segments acute.—Native of the Cape of Good Hope, like all the other species. This is said in the *Forstus Kewensis* to have been introduced into England in 1793, by Messrs. Lee and Kennedy. It is a green-house shrub, flowering all summer long. The short slender smooth leaves, standing in four rows, resemble those of some kinds of beech. The flowers are large and white, in terminal solitary heads, subtended by bractees broader than the leaves, of an elliptical figure, and tinged with red. The stalk and base of each flower, as well as the outside of its limb, are all very woolly. Nothing is recorded respecting the scent of these flowers, nor have we had an opportunity of examining them sufficiently to ascertain this point; but we should expect them, from analogy, to be fragrant at some time of the day or night. An authentic specimen shews this to be *Passerina cephalophora* of Thunberg, and we presume it must be his *erioccephala*.

2. *L. purpurea*. Purple-flowered Lachnæa. Andr. Repof. t. 293. Leaves opposite, imbricated, in four rows, obtuse, keeled underneath. Segments of the calyx smooth. This elegant species, distinguished by its larger size, and rose-coloured or light purple flowers, whose outside is smooth and naked, except a short pubescence on the tube, was gathered at the Cape by Mr. James Niven, an indefatigable collector sent out by Gen. Hilbert, esq. M. P. It flowers in June and July, and is sheltered in the green-house in winter, where it is liable to perish from damps. The tube of each flower is white, with a woolly tuft at its base, like the former. The bractees are broad and almost round.

3. *L. glauca*. Glauous-leaved Lachnæa. Salisb. Parad. Leaves

t. 109. (*L. buxifolia*; Lamarek. Dict. v. 3. 373. Andr. Repol. t. 524. *Gnidia filamentosa*; Linn. Suppl. 224.) Leaves scattered, elliptical, glaucous. Segments of the calyx downy on both sides. — This beautiful species was communicated to Linnæus by his friend Bæck. Mr Niven sent it to Mr. Hibbert about the year 1800. Its broad elliptical glaucous leaves at once distinguish it. The flowers are white, fragrant, excessively copious in each round terminal head, their segments downy on both sides, pointed, and not very unequal. Minute glands alternate with the stamens, are found in the orifice of the tube, as in *Gnidia*, but smaller.

Some excellent remarks are given by Mr. Salisbury, in his *Paradisus*, in favour of the latter opinion of Linnæus concerning the calyx of this genus, which he therefore terms *cololla*, but the point seems to us still doubtful, at least, and we therefore adhere to what we have always maintained.

4. *L. conglomerata*. Crowded Lachnæa. Linn. Sp. Pl. 514. (*Passerina glomerata*; Thunb. Prodr. 75.) — Leaves opposite, imbricated in four rows, abrupt. Flowers opposite, crowded about the ends of the branches. Bractæes elliptical, three ribbed. — Gathered by Sparmann and Thunberg at the Cape, but as yet unknown to our cultivators. It is a small branching shrub, very closely resembling *Passerina filiformis*, but the leaves are shorter, and much more remarkably abrupt or retuse, nor are they at all incurved. The upper ones insensibly become bractæes, being dilated, elliptical, concave, with three, sometimes five, strong projecting ribs; their inner side is clothed with dense prominent wool. These bractæes continue, in three or four opposite pairs, to the end of each little branch, every one of them being accompanied by an axillary, solitary, small flower, whose tube, longer than the bractæa, is woolly, its limb nearly or quite smooth and naked. The colour of the flowers is apparently purplish; their segments are sufficiently unequal to make the plant a *Lachnæa*, though they and every other part are so very like *Passerina filiformis*, in whose segments likewise we think we perceive an inequality, that we are certain these two plants ought to be placed in one genus. They differ, however, specifically in their bractæes, which in *P. filiformis* are ovate, pointed, strongly keeled, with numerous smaller lateral ribs. We recommend this last to the notice of botanists who publish figures of plants. Of *L. conglomerata* we can find no representation in books. The synonyms quoted by Linnæus and copied by Willdenow, belong to a very dissimilar shrub, from which nevertheless the specific character seems to be taken, and which appears to be the following.

5. *L. physocides*. Physica-leaved Lachnæa. Lamarek. Dict. v. 3. 374. (*Saurunda tertie Classi affinis, foliis polii, capitibus bonæ spei*; Breyn. Cent. 18. t. 7?) — "Leaves linear-ovate-shaped, smooth, loosely imbricated. Heads small, clustered, white and downy." Lamarek describes this as "very closely resembling a *Physica*, in which genus he had placed it, till an examination of the flowers set him right. There he found quadrifid and octandrous, with so slight an inequality in the limb, that he doubts whether that character be sufficient to keep the plant distinct from *Passerina*. It is a branching shrub, the branches straight, slender, leafy, smooth, except the youngest shoots. Leaves numerous, sessile, linear-ovate-shaped, nearly triangular, quite smooth, straight, loosely imbricated, somewhat resembling *Diosma rubra*. The flowers are collected, from five to eight together, into cottony white heads, the size of a pea, terminating the numerous, very short, crowded little branches, which form a sort of corymb at the end of the principal ones.

The calyx is white, downy; its tube a line and half long, its limb in four oval, concave, unequal segments, nearly as long as the tube." The author received it dried from M. Thouin, as a native of the Cape. He objects to the synonym of Breynius, which we have, with great doubts, transferred hither from the preceding species. To this plate, in his own copy, Linnæus has written the name of *Physica imberbis*, a plant adopted in his *Montissa*, p. 209. from Bergius, without having seen a specimen himself; and he there copies this very synonym of Breynius, without recollecting that he had cited it already as *Lachnæa conglomerata*. Lamarek thinks it belongs to *Physica stipularis*. The plant of Bergius is certainly, by his description, a *Physica*, and if that of Breynius be the same, it must be erased from *Lachnæa*. We have one more error to correct concerning *L. conglomerata*, which is, that Thunberg thinks it the same with *Passerina ericoides*, though nothing can be more distinct than the latter in the Linnæan herbarium, with the ovate tube and small regular limb of its flower, so exactly resembling some species of *Erica*. This *Passerina* is, therefore, it seems, erroneously omitted in Thunberg's *Prodromus*. — The author last named, regardless of the irregularity of the flower, unites *Lachnæa* altogether with *Passerina*, a measure we are very unwilling to adopt. It is an opinion of the ingenious Correa de Serra, that, in every natural order, there are one or more genera, differing from the rest in the regularity or irregularity of the flower. *Lachnæa* then is the only genus of the *Thymelææ*, or Mezereon tribe, with an unequal or irregular flower. S

LACHNIS, in *Natural History*, the name which some have given to a genus of fossils, attributed to the class of the *fibræes*; the characters of which are, that they are fibrous bodies, not elastic, and composed of short and abrupt fibres, or filaments.

The word is derived from the Greek λαχν, a hair or short capillament or fibre.

The bodies of this genus have been divided into those which are composed of larger and broader, and those which are composed of smaller and narrower filaments. Hill's Fossils. See FIBRILLÆ.

LACHNOSPERMUM, in *Botany*, a genus so called by professor Willdenow, from λαχν, wool, and σπερμα, seed; indeed that author distinguishes this plant from *Stachelina*, on account of the wooliness which invests its seed. — Willd. Sp. Pl. v. 3. 1787. (*Stachelina* species; Thunb. Prodr. 143.) Class and order, *Syngenesia Polygamia-Æqualis*. Nat. Ord. *Composita Discoides*, Linn. *Cinaracephale*, Juss.

Ess. Ch. Receptacle hairy. Seeds invested with hairs. Calyx cylindrical, imbricated.

1. *L. crispifolium*. Willd. (*Stachelina fasciculata*; Thunb. Prodr. 143.) — A native of the Cape of Good Hope. — The branches of this shrub are divaricated, rigid, and downy. Leaves very small, about half a line in length, fasciculated, round, obtuse, invested with down. Flowers solitary, at the tops of the little branches, on short footstalks, 1 sometimes in pairs, the size of *Stachelina frutescens*. Calyx cylindrical, downy; scales ovate, acute, with a naked, elongated, spreading point. Seeds without a proper crown, unfolded with hairs. Receptacle hairy, the hairs as long as the florets.

LACHOW, in *Geography*, a town of Poland, in Volhyma; 28 miles N.W. of Constantinow.

LACHOWICZE, a town of Lithuania, in the palatinate of Brzesc; 28 miles S.W. of Pinsk.

LACHRYMA JOEL, in *Botany*. See COIX.

LACHRYMÆ BATAVICÆ. See RUPERT'S *Drops*.

LACHRYMAL. See LACRIMALIS.

LACHRYMAL *Ducts, Puncta, and Sac, Disease of.* See EPIPHORA, and FISTULA *Lachrymalis.*

LACHRYMAL *Fistula.* See FISTULA *Lachrymalis.*

LACHRYMAL *Gland, Disease of.* The lachrymal gland, lodged in the fossula of the anterior and external part of the roof of the orbit, and enveloped in the fat which surrounds the globe of the eye, is not frequently met with in a state of disease. Doubtless, it is often involved in the general inflammation, which affects all the contents of the orbit in cases of ophthalmia; but instances of this individual gland suffering inflammation by itself, must be regarded as extremely uncommon.

The lachrymal gland, however, is subject to scirrhus induration, which is more frequently noticed in dissections, than practice. We allude to cases, in which the gland is the only part thus diseased; for it is well known by all experienced surgeons, that when the eye-ball is affected with carcinoma, the lachrymal gland is very liable to participate in the dilemma, and for the sake of security, ought generally to be extirpated together with the eye.

A remarkable case is related by M. Guérin, where he extirpated a scirrhus lachrymal gland, which was so much enlarged, that it covered the whole of the eye-ball. The latter part, indeed, was entirely concealed, and might have been supposed to be confounded with the swelling, had not circumstances existed, which tended to shew, that the organ in question was found and situated under the tumour. M. Guérin successfully detached the swelling from the eye and eye-lids without injuring the rectus externus muscle.

If this can be received as really and unquestionably an example of a scirrhus lachrymal gland being found diseased quite alone, and extirpated by itself, it is a case which, perhaps, has not its fellow in the records of surgery. Possibly, the swelling might be nothing more than an encysted tumour.

LACHRYMATORIES, in *Antiquity*, small glass or earthen phials, with a long neck, found in the sepulchres of the ancients. Many antiquaries have supposed that these vessels served to collect the tears of the weeping friends that visited, or of persons hired for that purpose. This belief was grounded on the appearance of the opening of those phials, which is generally furnished with a round concave part well adapted for embracing the convexity of the eye-ball. On some lachrymatories are even found impressions of an eye, and sometimes of a pair of eyes. But here, as in many other cases, the eye appears to be merely emblematical. It may also be said that the opinion of tears being preserved in those vessels is unsupported by any ancient custom we are acquainted with, or by any well interpreted passage in ancient authors. This opinion was first broached by Chifflet; it soon spread over Europe, and was, in spite of its improbability, adopted and supported by Kirchmann, Kipping, and many other antiquaries. At last it was combated by Schoepflin and Paciaudi; so that at present it appears to be agreed on all sides that the lachrymatories did never contain any thing but balsms destined to moisten the funeral pile or the ashes of the dead, or else the blood of martyrs. There is in the Capitol a bas relief which is much in favour of this idea: on this marble, which represents the funeral rites at the death of Meleager, a woman approaches the pile, holding in one hand a large bellied vessel, and in the other a long slender phial with elongated neck and bottom, and in every respect similar to several earthen lachrymatories preserved in collections. This woman is in the act of pouring out of the large into the small vessel what may be supposed to be balsms or odoriferous oil for the purpose of perfuming the funeral pile of Meleager. If we may

believe Dumolinet, there have small spoons been found in lachrymatories, which may have served for distributing into several small phials the contents of a vessel of greater dimensions. Millin Dict.

LACHSA, denominated also *Hadjar*, and sometimes *Bahbrein*, in *Geography*, a province in Arabia, bounded towards the E. by the Persian gulf, towards the S. by Oman, towards the W. by the province of Nedsjed, and towards the N. by the territories of the wandering Arabs in the vicinity of Bassora. This province affords no great variety of productions. Its asses and camels are esteemed to be of an excellent breed; and of the latter some thousands are annually sold into Syria. In the interior parts the inhabitants subsist very much upon dates. Upon the coasts pearl-fishing is pursued with advantage; and there is a considerable trade in foreign commodities. The inhabitants of Lachsa are very much divided with regard to religion. Those who live in the towns are Shiites; but the peasants are, like the Bedouins, Sunnites. Here are also some Jews, and many Sabaeans, or Christians of St. John.

Lachsa was once a province of the empire; but the Arabs have long since shaken off the Ottoman yoke. Many Turks, descended from the ancient Pacha's, still remain in the province, and possess considerable estates, but have no share in the government. At present the sovereignty of this province belongs to the schiech of the Arabian tribe of Beni Khaled, which is one of the most powerful tribes in Arabia. The greater part of Lachsa is inhabited by Bedouins, and other petty tribes; but they all acknowledge the dominion of the schiech of Beni Khaled. The cities in the interior parts of this province are little known. Niebuhr.—Also, a town of Arabia, capital of this province, where the schiech resides, situated on the river Aftan, near the Persian gulf. N. lat. 26 50'. E. long. 48 34'.

LACHWA, a town of Lithuania, in the palatinate of Brzesc; 50 miles E. of Pimk.

LACING, in *Ship Building*, the name of one of the pieces composing the knee of the head, which is continued up to the top of the hair-bracket, and to which the figure and the ends of the head-rails are secured.

LACINIATED LEAF, in *Botany*. See LEAF.

LACINIAE PROMONTORIUM, in *Ancient Geography*, *Capo delle Colone*, a promontory of Italy, at the eastern part of Brutium, and bounding on the south the gulf of Tarentum. This cape was much celebrated on account of a temple of the Lucinian Juno, which was an object of great veneration, and which received many rich offerings from various parts. Authors report that here might be seen a large column of massive gold. The Romans report, that Hannibal, when he was forced to quit Italy by an order of the senate of Carthage, assembled in this place all his Italian allies, and massacred all who would not accompany him into Africa.

LACIPPO, or LACIFUS, a town of Spain, in Beticæ.

LACIS, in *Botany*, so named by Schreber, and derived from *lacis*, to *tear*, or *lacerate*, because the herbage of this genus exhibits a singularly jagged or lacerated appearance. Schreb. 366. Willd. Sp. Pl. v. 2. 1225. Mart. Mill. Dict. v. 3. (Mourera; Aubl. Guian. v. 1. 582. Juss. 421. Lamarck Illustr. t. 480.)—Class and order, *Polyandria Digynia*. Nat. Ord. uncertain.

Gen. Ch. Cal. Perianth none. Cor. none. Stam. Filaments numerous, about 40, capillary, winged on each side at the lower part, inserted into the receptacle which is surrounded by 12 spines; anthers oblong, cloven at the base, acute, incumbent. *Pist.* Germen superior, oblong, angularly striated; styles two, incurved; stigmas obtuse. *Peric.* Cap-  
sule

file ovate, with eight furrows, of one cell and two valves. Sucle numerous, very small, affixed to an ovate, unconnected receptacle.

Eff. Ch. Calyx none. Corolla none. Capsule of one cell, two valves and many seeds.

1. *L. fluviatilis*. Willd. (*Mourera fluviatilis*; Auhl. Guian. t. 233.) A native of rivers in Guiana, flowering and bearing fruit in November. Its Caribbean name is *Mourou*.—*Root* creeping. *Stems* herbaceous, simple, rough. *Leaves* alternate, divided into numerous, repeatedly jagged, lobes, dark green, curled and veined at the margin, rough, with minute points. *Flowers* in spikes, terminal, each one, before expansion, invellid with three small deciduous leaves. *Filaments* violet-coloured; anthers yellow.

We know not how Willdenow came to describe the leaves as smooth, for in Aublet's own specimens we find them extremely rough with minute points.

LACISTEMA, so denominated by Dr. Swartz, from *lacis*, a cleft, or *sfurro*, and *stema*, a stem, alluding to the division in the filament. Swartz. Prodr. 1. Fl. Ind. Occ. v. 2. 1091. Schreb. 783. Willd. Sp. Pl. v. 1. 27. Mart. Mill. Dict. v. 3.—Class and order, *Monadelphia Diandria*. Nat. Ord. *Amniaceae*, Linn. Juss.

Gen. Ch. Cal. a common Catkin, cylindrical, imbricated on all sides; scales single-flowered, ovate, concave, with two smaller, linear, lateral, internal scales under the corolla. *Cor.* of one petal, in four deep, nearly equal, lanceolate, acute, ascending segments, shorter than the internal scales, without any tube. Nectary of one orbicular, concave, entire, central leaf, less than the petal. *Stam.* Filament solitary, from the centre of the nectary near the germen, erect, cloven in the upper part and incurved over the pistil; anthers solitary on each branch of the filament, minute, roundish. *Pist.* Germen superior, globose; styles two, very short, recurved; stigmas simple. *Peris.* Berry stalked, obovate, of one cell. *Seed* solitary, oblong.

1. *L. myricoides*. Swartz. Prodr. 12. Fl. Ind. Occ. v. 2. 1093. Ic. Plant. 5. t. 1. (Piper aggregatum; Berg. in Act. Helvet. v. 7. 131. t. 10.)—Received by Bergius from Surinam. Swartz found it in bushy parts of mountains, on the western side of Jamaica, but sparingly, flowering in spring, and ripening fruit in summer. This is a *shrub*, or small *tree*, with a smooth bark. The principal *branches* are round, lax, and smooth, with a few alternate zig-zag subdivisions. *Leaves* alternate, stalked, two or three inches long, elliptical, pointed, entire, very smooth, brownish-green, with one rib and several transverse veins. *Stipulas* none. *Catkins* axillary, several together, sessile, loosely spreading, a little curved, about half an inch long, whitish, many-flowered, hairy at the base. The *flowers* are extremely minute; the *corolla* white. *Berry* black and soft, the size of a red currant, with a sweetish insipid taste. There is some difficulty in describing the parts of the flower, especially the inner scales, which Swartz incautiously named *bractææ*, though situated within each proper scale of the catkin. *Nematosperrum* of Richard in the *Actes de la Societé d'Hist. Nat. de Paris*, v. 1. 105, is justly indicated as nearly allied in description to this plant, except that it is said to have three stigmas (or rather styles), and a capsule with three seeds, suspended from its valves by threads. We presume therefore they cannot be the same genus. See NEMATOSPERMUM.

LACK, in *Geography*, a township of America, in Mississipp county, Pennsylvania, containing 1071 inhabitants.

LACK OF RUPEES. See RUPEE.

LACKAH, in *Geography*, a small river of Ireland, in the county of Donegal, which flows into Sheeplaven.

LACKANWADDY, a town of Hindoostan, in the circar of Aungmyahad; 45 miles E. of Jafferabad.

LACKAR, an island in the East Indian sea, about 30 miles long and six broad. S. lat. S 18'. E. long. 128° 14'.

LACKARAGO, a town of Africa, in the kingdom of Kaffon.

LACKARI, a town of Persia, in the province of Irak; 120 miles N.W. of Ispahan.

LACKER. See LAQUER.

LACKERGAUT, in *Geography*, a town of Thibet; 45 miles S. of Deuprag.

LACKI, a town of Hindoostan, in Bengal; 56 miles N. of Dacca.

LACKIPOLE, a town of Bengal; 16 miles N.E. of Calcutta.

LACKRICOTTA, a town of Hindoostan, in the circar of Cicacole; 24 miles S.W. of Vizianagram.—Also, a town of Hindoostan, in Coimbatore; 13 miles S.W. of Coimbatore.

LACKRITAPILLA, a town of Hindoostan, in the circar of Cuddapa; 20 miles S.W. of Cuddapa.

LACMUS. See LIMUS.

LACOBENA, in *Ancient Geography*, a town of Asia, situated between the mountains N. of Comagene, on a small river, which ran into the Euphrates, S.E. of this town.

LACOBIRIGA, a town of Spain, upon the Pisoraca, S. of Juliobriga and N.E. of Pallantia, belonging to the Vaccii.

LACOCK'S BAY, in *Geography*, a bay on the N.E. coast of Barbadoes; one mile N.W. of Cuckold's Point.

LACONCAVAN, a town of Upper Siem, on the Mecon; 80 miles S. of Porcelan.

LACONDY ISLES, two small islands among the Laccadives, about three miles apart. N. lat. 10 33'. E. long. 71° 40'.

LACONIA, in *Ancient Geography*, a country afterwards called Sparta and Lacedæmon, was situated on the S.E. point of Peloponnesus, and bounded on the N. by Argos and Arcadia, on the W. by Messenia, on the E. by the bay of Argos, and by the Mediterranean on the S. On the W. were the mountains named Taygetus, from some of the summits of which, which are said to have risen above the clouds, the eye might survey the whole of Peloponnesus. The sides of these mountains were every where covered with woods, which were the asylum of a great number of goats, bears, wild boars, and stags. The extent of Laconia from E. to W. where it reached farthest was 1° 45', but it became narrower towards the north, and its extent from N. to S. was about 50 miles. As the fourth part of this kingdom was encompassed by the sea, and the east and north-east part by the Argolic bay, it had a great number of portuories, the chief of which were those of Melea and Tanara, now capo Malio and capo Matapan. These two being situated on the Mediterranean form the large Laconian gulf, which lies between them, and is now called the Golfo di Colochina, into which the famed river Eurotas, better known by the name of Basilipotamo, or Royal river, discharged its waters with an easy and gentle course. The sea-coasts of Laconia were furnished with a considerable number of sea-ports, towns, and commodious harbours, of which the largest and most convenient were those of Trinassus and Acria, situated one on each side the mouth of the Eurotas, and Gythium, at a small distance from Trinassus; which last is said to have been built by Apollo and Hercules; but the most noted was Epidaurus, now Malvesia, seated on the gulf of Argos, now Golfo di Napoli, a well-built town, famous for its excellent wine

wine called Malvesy, or Malmesey, which was produced from grapes that grew round it. There were about 12 more sea-port towns along the Lacedæmonian coasts; and they were rendered particularly famous on account of a shell fish caught in the neighbourhood, which yielded a purple dye, inferior to none but that which was brought from the Red sea. Inland towns likewise abounded in this kingdom, the most considerable of which was the metropolis *Sparta*, which see. Other cities of note were *Amyclæ*, *Helvæ*, *Thulana*, and *Leuctrum*. The mountains of Lacedæmonia were numerous. Its most considerable rivers, besides the Eurotas, were the *Simenus*, the *Thiasus*, and the *Seyras*. The soil was very rich, especially in the low and flat grounds, and being well watered, it was excellent for pasture; but the number of its mountains and hills prevented its being so well tilled, as it might otherwise have been. It was much better situated for trade and navigation, by having the sea round above half the kingdom, and so many good havens about it. How well the inhabitants improved these advantages, how powerful they became, what fleets they maintained, and brave experienced admirals they bred, may be seen in their history. We shall here only observe, that the Lacedæmonians were a courageous people, hardy, and inured to war both by sea and land, averse from sloth and luxury, jealous of their honour and liberty, as well as the power of their neighbours; nor were they wanting in any military discipline, in order to secure the one, and curb the other. By these means they became so powerful, and made so considerable a figure in Greece, that the kings of Egypt and Phœnicia did not disdain to pay a kind of homage to them, and own their superiority by solemn embassies. See *LACÆDÆMONIANS*.

*LACONIA*, in *Geography*, a tract of land, extending from the river Merrimack to Sagadahock, and from the ocean to the lakes and rivers of Canada, so called in the grant of lands, in 1622, from the council of Plymouth to Capt. Mason, and Sir Ferdinand Gorges. See *IROQUOIS*.

*LACONIC STYLE*. See *STYLE*.

*LACONICA SCYTALA*. See *SCYTALA*.

*LACONISM*, *Λακωνισμός*, a short, pithy, sententious speech, in the manner of the Lacedæmonians, who were remarkable for the closeness and conciseness of their way of delivering themselves.

*LACOVIA*, in *Geography*, a town of Jamaica; 55 miles W. of Kingston.

*LACQUER*, or *LACKER*, is a varnish applied upon tin, brass, and other metals, to preserve them from tarnishing, and to improve their colour. The basis of lacquers is a solution of the resinous substance called seed-lac, or rather shell-lac, in spirit of wine. This spirit ought to be very much dephlegmated in order to dissolve much of the lac. For this purpose, some authors direct dry pot-ash to be thrown into the spirit. This alkali attracts the water, with which it forms a liquid that subsides distinctly from the spirit at the bottom of the vessel. From this liquid the spirit may be separated by decantation. By this method the spirit is much dephlegmated; but at the same time it becomes impregnated with part of the alkali, which depraves its colour, and communicates a property to the lacquer of imbibing moisture from the air. These inconveniences may be prevented by distilling the spirit; or, if the artist has not an opportunity of performing that process, he may cleanse the spirit in a great measure from the alkali, by adding to it some calcined alum, the acid of which uniting with the alkali remaining in the spirit, forms with it a vitriolated tartar, which, not being soluble in spirit of wine, falls to the bottom together with the earth of the decomposed alum. To a pint of the dephlegmated and purified spirit, about three ounces

of powdered shell-lac are to be added; and the mixture to be digested during some days with a moderate heat. The liquor ought then to be poured off, strained, and cleared by settling. This clear liquor is now fit to receive the required colour, from certain resinous colouring substances, the principal of which are gamboge and anotto, the former of which gives a yellow, and the latter an orange colour. In order to give a golden colour, two parts of gamboge are added to one of anotto; but these colouring substances may be separately dissolved in the tincture of lac, and the colour required may be adjusted by mixing the two solutions in different proportions. When silver-leaf, or tin, are to be lacquered, a larger quantity of the colouring materials is requisite than when the lacquer is intended to be laid on brass.

There are sundry other materials, from a due mixture of which a like colour may be produced, as turmeric, saffron, dragon's blood, &c. See *Gold Coloured VARNISH*, and *Japanner's GILDING*.

Instead of shell-lac, used in the composition of varnishes for lacquering, resin or turpentine is substituted for the coarser uses. The following composition for brass-work, designed to resemble gilding, has been much recommended: take of turmeric ground, as it may be had at the dry-stalls, one ounce, and of saffron and Spanish anotto each two drams: put them into a bottle with a pint of highly rectified spirit of wine, and place the bottle in a moderate heat, occasionally shaking it, for several days; then strain off the yellow tincture thus obtained, through a coarse linen cloth, and putting it back into the bottle, add three ounces of good seed-lac grossly powdered; place the bottle again in a moderate heat and shake it, till the seed-lac be dissolved. The lacquer strained as before will be fit for use, and must be kept in a bottle carefully stopp'd. By increasing or diminishing the proportion of anotto, the lacquer will be rendered warmer and redder, or cooler and nearer a true yellow. A cheaper composition little inferior to the former, may be formed of one ounce of turmeric root ground, half a dram of the best dragon's blood, and a pint of spirit of wine, managed as the former.

The varnish for tin may be made of one ounce of turmeric-root, two drams of dragon's blood, and one pint of spirit of wine, prepared in the same manner with the other. The dragon's blood may be increased or diminished, as the red or yellow is to be the most prevalent; and for a coarser lacquer the quantity of shell-lac may be lessened, and the deficiency supplied by the same proportion of resin. The lacquer for locks, nails, &c. where little or no colour is desired, may be either shell-lac varnish alone, or with a little dragon's blood; or a compound varnish of equal parts of shell-lac and resin; with or without the dragon's blood. The manner of laying on the lacquer is as follows: the pieces to be lacquered must first be made thoroughly clean; and if they be new founded, aquafortis must be used for this purpose. When they are afterwards heated by a small charcoal fire, the lacquer is laid on with a proper brush, like other varnishes, and the pieces restored to the heat. After the lacquer is thoroughly dry and firm, the same operation must be renewed for four or five times, or till the work appears of the required colour and brightness.

The lacquering of leather, improperly called gilding, is performed by means of leaf-silver, coloured by a yellow varnish. (See *Japanner's GILDING*.) For this purpose, calf or goat-skins are procured in a dry state, after the common dressing and tanning. They are softened by being immersed and stirred about for some hours in a tub of water; and afterwards beaten against a flat stone and smoothed, by spreading them on the stone and rubbing them

them over with an iron instrument: the skins, thus prepared, are joined together in pieces of the dimensions required; and then fixed on the grain of the leather with a kind of soft glue, or stiff size, that answers to the gold-size used in other kinds of gilding or silvering, prepared from parchment or glover's cuttings. The workman next proceeds to cover the whole surface of the fixed skin, before it be quite dry, with leaf silver, and with a fox's tail, made into the form of a ball at the end, settles the leaves, by pressing and striking them; and closes this operation with gently rubbing the whole surface with the tail. When the skins are silvered, they are hung to dry first on cords, and the drying is completed by putting them over a board joined together, with the silvered side next the boards, where they must be kept stretched out by means of some nails. They are then burnished with a flint burnisher, which operation is performed by spreading the skin even on a smooth stone, and sliding the burnisher backwards and forwards over every part of the skin, with a considerable degree of pressure. In some manufactures the burnishing is performed, by passing the silvered skins betwixt two cylindrical rollers of steel, with polished faces. The skins are now prepared for receiving the yellow lacquer or varnish, which gives the appearance of gilding. Different artists have different recipes for compounding this lacquer. The following is said to be equal to any hitherto used: take of fine white resin,  $4\frac{1}{2}$  pounds; the same quantity of common resin; of gum sandarac,  $2\frac{1}{2}$  pounds; and of aloes, two pounds: bruise and mix them; and put them into an earthen pot over a good fire of charcoal, or over any other fire which has no flame: when all the ingredients are perfectly melted and mixed, add gradually to them seven pints of linseed oil, and stir the whole well together with a spatula: let the whole boil, stirring all the time, to prevent a kind of sediment, that will form, from sticking to the bottom of the vessel. When the varnish is almost sufficiently boiled, which will generally require seven or eight hours, add gradually half an ounce of litharge, or half an ounce of red lead; and when this is dissolved, pass the varnish through a linen cloth, or flannel bag. A pint of oil, and a corresponding proportion of fine resin and aloes, have produced a very good varnish in an hour and a half. This lacquer or varnish is laid on the silvered leather in the open air; and is best done in summer, when it is hot and dry. For this purpose, the skins are stretched and fastened with nails to the boards, on which the drying was finished, with the silvered side outwards. And when these boards are properly disposed on trestles, the workman generally spreads some white of eggs over each skin; and when this is dry, the varnish, which is nearly of the consistence of a thick syrup, is repeatedly spread with the four fingers of one hand, moved so that each finger paints a kind of S with the varnish, from one end of the skin to the other: and it is then diffused evenly over every part with the flat of the hand: after this it is to be immediately beaten by strokes of the palms of the hands, and principally where the varnish is observed to lie thickest. When this coat of varnish is sufficiently dry, which may be known by the fingers making no impression upon it, another coat is laid on in the same manner. When this coat is dry, the varnishing for producing the appearance of gilding is completed; and if it has been well performed, the leather will have a very fine gold colour, with a considerable degree of polish or brightness. When there is an intention to have one part of the leather silver, and the other gold, a pattern is formed on the surface, by printing, calking or stamping, a design on

the surface after the silvering. The skin is then to be varnished, as if the whole were intended to be gold; but after the last coat, instead of drying the varnish, it is to be immediately taken off that part, which is intended to be silver, according to the design printed or calked upon it, by a knife; with which the workman scrapes off all that he can without injuring the silver, and afterwards by a linen cloth, with which all that remains is to be wiped or rubbed off. The skins thus silvered and varnished, are made the ground of various designs for embossed work and painting. The embossed work or relief is raised by means of printing with a rolling press, such as is used for copper plates; but the design is here to be engraved on wood. The painting may be of any kind; but oil is principally used, as being durable and more easily performed. Doffie's Handmaid to the Arts, vol. i. p. 454, &c.

**LACRIMOSO**, *Ital.* a musical term, seldom used now, which implies a plaintive movement, in a style as if *suspecting*.

**LACRYMA CERVINA**, in *Natural History*, a little round and hard bone, said to grow in the great corner of a stag's eye after a certain age. Some also preserve under this name a thickened excretion from the inner angle of that creature's eye, in colour and consistence resembling myrrh, or ear-wax, long hardened in the ear. This is of a strong and very disagreeable smell, like the sweat of the same animal, and is affirmed to be sudorific and alexipharmic.

**LACRYMÆ CHRISTI**, the name of a sort of wine produced by grapes on the lower part of Mount Vesuvius; so called from the drops of juice oozing from the grapes, when fully ripe.

**LACRYMAL**. See **LACHRYMAL**.

**LACRYMALIS**, in *Anatomy*, an epithet applied to several parts about the eye. The lacrymal gland is the organ secreting the fluid which composes the tears: the puncta lacrymalia are the orifices of two small ducts, by which this fluid is absorbed from the surface of the eye; and the lacrymal sac or bag is the cavity in which the tears so absorbed are received. See **EYE**.

The os lacrymale is a name applied to the bone in which the lacrymal bag is lodged; it is called also os unguis. See **CRANIUM**.

The lacrymal nerve is a branch of the ophthalmic or first branch of the fifth pair. See **NERVE**.

**LACSUR**, in *Geography*, a town of Persia, in the province of Korafan; 50 miles N.E. of Herat.

**LACTANTIUS**, generally called **LUCIUS CÆLIUS**, or **CÆLIUS FIRMIANUS**, in *Biography*, the most eloquent of the Latin fathers, flourished towards the close of the third and the beginning of the fourth century. Some have conjectured that he was born at Firmum, now Fermo, in Italy, and hence called Firmianus; but as he was a disciple of Arnobius, who taught rhetoric at Sicca in Africa, this was probably the country of his nativity. This latter opinion is confirmed by his itinerary from Africa to Nicomedia, which contained, as we may reasonably imagine, an account of his own journey, when he was sent for by Dioclesian. Whilst he was young, he wrote his "Symposium," or Banquet, and thus acquired a degree of reputation, which occasioned his being sent for to teach rhetoric at Nicomedia, when Dioclesian proposed to render this city a rival to Rome. Some have supposed that Lactantius was in his youth a heathen, and converted to the Christian faith; but it is most probable, from the arguments alleged by Dr. Lardner, that he was educated in Christian principles, and that he was a

Christian when he taught rhetoric at Nicomedia, at the commencement of Diocletian's persecution, though it does not appear how he escaped the danger to which his Christian profession must have exposed him, at a time when the church of the Christians in that city was destroyed. Nicomedia was at this time chiefly inhabited by Greeks, who had no great taste for Roman eloquence; and the religious profession of Lactantius, notwithstanding his learning and talents, rendered him unpopular, so that the number of his scholars was small, and he was under the necessity of writing, in order to procure a scanty subsistence. As he was much addicted to reading, and books in MS. were costly, his library must have exhausted his pecuniary supplies. These circumstances will account for the poverty of his condition; without supposing with Dupin and Tillemont that it was voluntary. His situation, however, was improved, when he was invited by the emperor Constantine into Gaul, and appointed preceptor to his son Crispus; but when Crispus was put to death by his father, he lost the benefit of this office; nor does it appear that Constantine made any permanent provision for him, which might reasonably have been expected. It is generally allowed, that, during the greatest part of his life, Lactantius was in indigent and even destitute circumstances, often wanting necessaries. Of other particulars of Lactantius's life, which was prolonged to a very advanced period, no records remain; nor has the time of his death been ascertained. It does not appear that he ever pleaded as an advocate at the bar. From his works, which are allowed to be authentic, we may collect his sentiments with regard to some of the distinguishing tenets of theology. Lactantius often speaks of the nature and design of the Christian revelation, as suited to promote the general good of all, of every age, sex, and condition; so that all may attain to just sentiments of God, and be directed and assisted in the way of holiness, and obtain everlasting happiness. And he asserts it to be in the power of the meanest and poorest of men to attain to righteousness. He sometimes glories in the great and happy effects of the Christian doctrine upon the minds and lives of men; and he recommends this divine religion, as the medicine of the soul, effectual for healing all its diseases. He asserts the freedom of man's will, or his power to do good or evil. He openly asserts the innocence of Christian people, all whose religion, he says, consists in good works, or a care to live unblameably and inoffensively. And the criminals, who fell under the sentence of the magistrate for robbery and other offences, he observes, were not Christians, but of the same religion with their enemies. He expresses himself as if in his time Christians performed miracles in dispossessing demons. Lactantius was of opinion, that another life, or a future state of happiness for good men, may be proved by reason. He did not deny the eternity of hell torments. With regard to repentance he often asserts its great value, and maintains, that whenever sinners repent, they are pardoned. He also thinks, that the divine displeasure against men ceases immediately upon their repentance and amendment. True virtue alone, as he alleges, recommends man to the divine acceptance; and God desires nothing of man but sincere virtue, or true holiness. As to the ends and views of Christ's coming, and particularly of his death, he asserts, that Christ came to be a teacher and a pattern of virtue; and that he died and rose again, to assist men in overcoming death, and give them also hopes of rising again, and obtaining the reward of immortality. Christ, he says, lived in a mean condition, and underwent the ignominious death of the cross, that he might be a complete example of virtue, and of pa-

tience under sufferings; and that he might more especially lead and encourage such as are poor and mean in this world. In a word, he says, Christ came, and was made like unto man, lived, and died, and rose again, that he might clearly teach the precepts of virtue, and afford the best motives to the practice of it, and effectually help frail man to conquer the desires of the flesh, and the fears of present evil, and to overcome all the temptations of this life, and thus obtain a happy immortality.

Lactantius has strenuously asserted the right of private judgment for every man in things of religion, and he exhorts all men to the resolute and diligent exercise of it. He also argues excellently against perfection; esteeming it the greatest absurdity that can be conceived, for any to impose on others a worship contrary to their conscience, or to deny men the liberty to choose their own religion; and expressly affirming, that it is not zeal for religion, but a love of power. For religion, he says, is the freest thing in the world; nor can it be promoted by force and violence. Compulsion may make men hypocrites, but it cannot make them religious. He also maintains, that it is no just reason why men should be persecuted, because they desert or oppose ancient and established religions. For there can be no proscription against truth; and every man has an unalienable right to search after truth, and to profess it, when he has acquired the knowledge of it;—with much more, admirably expressed, to the same purpose. Of the numerous errors, real or imaginary, charged upon Lactantius, we shall enumerate the following: the first and principal is that of Manichæism, from which he is vindicated by Lardner. It is well known, that he denied the existence of Antipodes. He adopted the common notion of the age in which he lived concerning the fall of many of the angels; and he expected a terrestrial reign of Christ for 1000 years before the general judgment, and he thought it to be very near, within a period of 200 years. (See MILLENNIUM.) Lactantius denied the personality of the holy ghost; nor did he consider Christ's death as a propitiatory sacrifice for sin, or a satisfaction made to divine justice for the sins of the human race. These opinions, in which he differs from many others, and some of which are undoubtedly erroneous, have occasioned several reflections upon his judgment and character. Dr. Heumann, in particular, acknowledges that he was pious, learned, and eloquent; though chargeable with several faults and defects; he was no critic, nor philosopher, and but a poor divine. Bull says, that he had very little knowledge of the Christian doctrine; and Warburton asserts, that he knew but little of Christianity.

As a writer, Lactantius has been highly commended. Dupin says, that he is justly esteemed the Christian Cicero for his style, whilst he greatly surpassed him in his thoughts. Some authors have not only found a striking resemblance between the style of Cicero and that of Lactantius, but have even preferred the latter to the former. Dr. Lardner says of him, "that the time in which he lived secures him a kind of veneration. He saw the quiet and peaceful state of the church before Diocletian's persecution; he was also witness of that dreadful scene, and afterwards saw the flourishing condition of Christians under Constantine. His eminent abilities recommended him to the esteem of two great emperors, of different religions. His uncommon honesty and simplicity, and earnest zeal for the Christian religion, and all truth in general, appear in his works, where also his learning is very conspicuous." He had, as it seems, a certain vehemence and impetuosity of natural temper not uncommon in Africans, which on some occasions hindered

his considering and weighing what might be said on both sides of a question. At the same time, possibly we are indebted to that fire, which supported him in the fatigues of acquiring knowledge, and then communicating it to others. Upon the whole, he was "an honour and ornament to the Christian profession in his day;" for "he employed his fine parts and extensive learning in the service of religion, without worldly views of any kind." "A part," it will be allowed, "of this writer's reputation is owing to the charms and beauties of his style; but the matter of his works is also a just recommendation."

The principal work of Lactantius is intitled "Institutionum, libri vii." which was occasioned by the writings of two heathens of note, who published their pieces against the Christians at the beginning of the persecution under Dioclesian, and was also intended as a general answer and full confutation of all others, who already had opposed, or hereafter might oppose, the Christian doctrine. The learned are not agreed about the time when this noble work was written. Dr. Lardner, after having examined different opinions on this subject, concludes, that Lactantius formed the design of this work in the year 303, that he composed the greatest part of it under the persecution of Dioclesian, and that, probably, it was not published till that persecution terminated. We have also an "Epitome" of the Institutions, inscribed by Lactantius to his brother Pentadius, which is supposed to have been written not later than the year 311, 312, or 313. This work was imperfect, until a copy of it was found in the library of the king of Sardinia at Turin, by Dr. Christopher Matthew Pfaff, and published by him in 1712, or nearly so, at Paris in 1712, to the great joy of the learned world. This abridgment is an useful book, and contains some things not to be found in the Institutions themselves. His book "De Ira Dei," *i. e.* of the wrath or anger of God, which is still extant, is particularly commended by Jerom, as a learned and elegant performance, and a complete treatise on the subject. In this work he endeavours to prove that God is capable of anger, as well as of mercy and compassion. In his treatise "De officio Dei," *i. e.* of the workmanship of God, he establishes the doctrine of God's providence, by demonstrating the excellence of man, his principal work, giving an elegant description of the parts of the human body, and the properties and faculties of the soul. Of the genuineness of another work, usually ascribed to Lactantius, and intitled "De Mortibus Persecutorum," *i. e.* of the deaths of persecutors, different opinions have been entertained. Dr. Lardner has referred to the writers who have espoused both sides of the question; and as for himself, he seems to incline to the opinion of those who do not allow it to have been written by Lactantius. He allows, however, that it is a very valuable work, containing a short account of the sufferings of Christians under several of the Roman emperors, from the death and resurrection of Christ to Dioclesian; and then a particular history of the persecution excited by that emperor, with the causes and springs of it; as well as the miserable deaths of its chief instruments. In this work occur also several remarkable facts, that are recorded no where else. This is a work which none of the ancients, after the time of Jerom, have noticed; it was first published by Stephen Baluze in the second volume of his *Miscellanea*, in the year 1679. It is needless to say any thing of the poems de Phœnice, de Pasche, de Passione Domini, which some have ascribed to Lactantius, and which are joined to his works in most editions. They are not mentioned by Jerom, and are now generally supposed not to belong to this author. The "Itinerary" and "Grammaticus," mentioned by Jerom, are irrecoverably lost. A work, under the title of the "Symposium," or Banquet, long supposed to have been lost, was not long ago published by Dr. Heumann, who asserts its genuineness. It is a collection of 100 trifling epigrams, with a prologue. All our author's books of Epistles are entirely lost. The editions of Lactantius are very numerous. Fabricius has given a full and copious catalogue of them. The first edition was published at Rome, in 1468, fol. by Conrad Lewenheim; and the last, which is the most correct, was edited at Paris in 1748, in two vols. 4to, by the Abbé Lenglet.

Lactantius has, in his various works, references to the gospels, the Acts of the Apostles, and some of the epistles, and to the book of the Revelation, which he expressly quotes as sacred scripture, and written by John. It appears also, that he had a collection of scriptures, consisting of the Old and New Testament; which he esteemed sacred and divine, and of the highest authority. His quotations of Sibylline books, and other writings, ascribed to heathen vates or diviners, such as Hydaspes, and Hermes Trifmegillus, were intended to serve the cause of Christianity; but he did not reckon them a part of those books which were of authority with Christians. Nor does it appear, that he placed the preaching of Peter and Paul in the rank of sacred scripture, though he has once quoted it. Fabr. Bibl. Eccl. fol. Hieron. cap. lxxx. Cave's H. L. vol. sub sæc. Arian. Dupin. Lardier's Works. vol. iv.

LACTARY, in *Rural Economy*, a term frequently applied to a milk-house, or place where milk is kept.

LACTARY Column. See COLUMN.

LACTATION, the act of giving suck.

The word is also applied to the time during which the mother doth that office to her young.

LACTEA VASA, or *Lacteals*, in *Anatomy*, are those absorbing vessels which take up the chyle, or the nutritive matter furnished by the food, from the surface of the intestines. As this fluid is of a white colour, the vessels, when filled with it, appear quite white, and hence their name. They may be seen in vast abundance in an animal killed a few hours after a meal. See ABSORBENTS.

LACTEA Via, the milky way. See GALAXY.

LACTEAL Fevers, a term used by *Medical Writers*, to express what the women call *milk fevers*, that is, such fevers as attend the difficult ingreſs of milk to the breast of lying-in women. See LABOUR.

LACTEALS of Birds. See *Anatomy of BIRDS*.

LACTEUS LAPIS, in *Natural History*, a name given by some authors to the galacites.

LACTIFERI DUCTUS, in *Anatomy*, the tubes of the mammary gland, in which the milk is secreted. See BREAST.

LACTIFEROUS, an epithet applied to such plants as abound with a milk-like juice, such as the tithymal, fowthistle, and many others.

LACTOMETER, in *Rural Economy*, the name of an instrument for the purpose of ascertaining the different qualities of milk. It was invented by Mr. Dicas, mathematical instrument maker, in Liverpool; and the following description of it is given in the Survey of the County of Lancaster. This lactometer is contrived so as to ascertain the richness of milk from its specific gravity, compared with water, by its degree of warmth taken by a standard thermometer, on comparing its specific quality with its warmth, on a scale constructed for this particular purpose, and by which, if the principle be right, may be discovered not only the qualities

of the milk of different cows, pastures, food, as turnips, potatoes, grains, &c. but also probably, which may be the best milk or best pastures for butter, and which for cheese. This instrument, however, is but in its infancy. At his own house, the writer has made a number of varied experiments upon different milks from different farms.

It is stated to be constructed with ten divisions upon the stem, similar to the patent brewing hydrometer, and with eight weights, which are to be applied only one at a time upon the top, to obtain the weight of milk; an ivory sliding-rule accompanies the instrument, upon the middle or sliding part of which is laid down the lactometer weight of the milk, going from 0 to 80; and opposite thereto are placed the various strengths of the milk, from water to 160; 100 having previously been fixed upon, from a number of experiments, as the standard of good new-milk, and each of the other numbers bearing a proportionate reference thereto. At one end of the sliding-rule the degrees of heat, from 40 to 100, are placed with a star opposite, as an index to fix the slide to the temperature of the milk; the whole being graduated to shew the exact strength of the milk, as it would appear in the temperature of 55 degrees of heat, although tried in any inferior or superior temperature between 40° and 100°: thus the great inconvenience which would attend bringing the milk at all times to one temperature is avoided, and a simple mechanical method of allowing for the contraction and expansion substituted. And as skimmed milk, being deprived of the particles of butter which existed before skimming, appears to have a less degree of affinity with that than the new milk has, one side of the ivory sliding-rule is adapted to skimmed, and the other to new. This simple contrivance is represented in the annexed plate.

*General Rule.*—First, find the temperature of the milk with the thermometer, and fix the sliding-rule so that the star shall be facing the degree of heat the mercury rises or falls to; then put in the lactometer, and try which of the weights, applied to the top, will sink it to some one division upon the stem; add the number of the weight upon the top and that of the division together, and opposite the same, formed upon the side, will be shewn the strength of the milk.

*Examples of New milk.*—If in the temperature of 72°, the lactometer with the weight 40 sinks to 9 upon the stem, fix the slide so that the star shall be facing 72°; then opposite 49 will be found 100, the strength of the milk. Again, if in 66°, the lactometer with 50 on the top sinks to 6 upon the stem, the slide being fixed for new-milk, so that the star shall be at 66° of heat, then facing 50 will be found 110, the strength of this milk in proportion towards the other, provided it is equally replete with cream. To discover which, it becomes requisite these two samples being stand a certain time, that the cream may rise, which being taken off, they are to be tried with the lactometer again; and as the cream is evidently the lighter part, the milk will appear by the lactometer denser or better in quality than before. Suppose the milk in the first example to be 57 by the lactometer in 60 degrees of heat, then the strength by the skimmed-milk side of the rule will be 112. And admit the second example of new-milk to be 58 in 64° when skimmed, the strength would be 116.

As a comparison say,

No. 1. New-milk	-	100
Ditto skimmed	-	112
		—
Difference		12
		—

No. 2. New-milk	-	110
When skimmed	-	116
		—
Difference		6
		—

From which it appears, that No. 1. has produced a larger quantity of cream than No. 2, and consequently may be deemed the better milk. Some instances have occurred where the strength of new-milk has only been about 80, and when skimmed near 100. Thus it may, without the least impropriety, be called a milk much better adapted for making butter than cheese; the serum or whey in general being near the same density.

The instances in which the lactometer may be useful, are, according to the same writer, in discovering what breeds of cattle are most advantageous; what food in the winter season, whether carrots, turnips, potatoes, &c. are best; what the effects of different pastures may be; how far particular farms are best adapted to making butter and cheese; how far the inconvenience of large cheeses in some dairies being too rich to stand may be prevented, by discovering when this redundancy of richness exists in the milk; and in fixing a standard for the sale of this useful article of life.

A standard for skimmed milk may readily be fixed, by saying what strength the common saleable skimmed milk shall be by the lactometer, or what its specific gravity shall be in relation to that of water in the temperate degree of heat, and that an easy comparison may be made between the specific gravity of any milk, and its lactometer strength; this instrument is so constructed, that one of specific gravity shall exactly correspond with three of strength; that is, the strength of 90 by the lactometer is a milk whose specific gravity is 1030, to common pump water 1000. From a number of experiments and observations, it is observed, that the common saleable skimmed milk in Liverpool is from 52 to 64 of strength, and that of new-milk from 70 to 80; but it would be difficult to fix any standard for the latter, unless some mode could be devised to discover whether it was mixed with old milk or not. The only method would be, after fixing the strength of it, to try, by letting it stand, to discover if it produced that quantity of cream, which as new-milk it might reasonably be expected to do.

This ingenious contrivance is made use of in the Liverpool workhouse, with great success in ascertaining the goodness of the milk which is there employed.

**LACTUCA**, in *Botany*, so called by the Latins, from *lac*, milk, because of its milky juice; the Lettuce.—Linn. Gen. 400. Schreb. 528. Wild. Sp. Pl. v. 3. 1523. Mart. Mill. Diét. v. 3. Art. Hort. Kew. v. 3. 117. Sm. Fl. Brit. 819. Juss. 169. Tourn. t. 267. Lemarec. Illustr. t. 649. Gærtn. t. 158.—Class and order, *Syngenesia Polygamia equalis*. Nat. Ord. *Composita Semisibiculae*, Linn. *Cichoraceae*, Juss.

Gen. Ch. *Common Calyx* imbricated, nearly cylindrical, of numerous pointed scales, with membranous edges. *Cor.* compound, imbricated, uniform; the florets hermaphrodite, numerous, equal, each of one petal, ligulate, abrupt, with four or five teeth. *Stam.* Filaments five, capillary, very short; anthers united into a cylindrical tube. *Pist.* Germen nearly ovate; style thread-shaped, as long as the stamens; stigmas two, reflexed. *Peric.* none, except the permanent clored calyx, become rather ovate at the base. *Seeds* foliary, obovate, pointed, striated, compressed; down capillary, supported by a long stalk tapering at its base. *Recept.* naked.

Eff. Ch. Receptacle naked. Calyx imbricated, cylindrical,

cal, with pointed, membranous-bordered scales. Seeds compressed, striated. Down simple, stalked.

This genus is most naturally allied to *Sonchus*, the Sow-thistle, in habit and qualities, as well as fructification, the stalked seed-down, and much more slender and cylindrical calyx, constituting its chief marks of distinction. The 14th edition of *Syll. Veg.* enumerates ten species; Willdenow has 21. Three of them are natives of Britain, occurring chiefly in warm dry spots, where the soil is calcareous. These are *L. virgata*, Engl. Bot. t. 1957. Woodv. Med. Bot. Suppl. t. 250, celebrated for its opium-like scent and soporiferous quality; *L. Scariola*, Engl. Bot. t. 268, a more slender and less active plant, distinguished by the vertical posture of its leaves, of much more rare occurrence, being scarcely found wild except in the isle of Ely; and *L. falkna*, Engl. Bot. t. 707. Jacq. Austr. t. 250, the most slender of all, which ever since the time of Ray has been stationary about Pancras, and near the Small-pox Hospital. These are all biennial plants, three or four feet high, more or less glaucous, with small sulphur-coloured flowers, which expand only in bright sunny mornings. The Rev. Mr R. B. Francis found the last-mentioned at South-end, Essex, but it is among the most uncommon of English plants.

Of the foreign species, *L. fativa*, Linn. Sp. Pl. 1118. Ger. em. 366, is well known as the Garden Lettuce, rendered luxuriant, mild, and wholesome by culture; for though we know it not in an actually wild state, some idea of its nature may be discovered by allowing it to sow itself spontaneously for two or three generations, the produce of which will be found much more bitter and acrid, as well as far less luxuriant, than the cultivated plants. Of this species the *L. crispa*, Willd. n. 2. Ger. em. 366. Dod. Pempt. 644, appears to be a variety, as it has always been thought, till Roth distinguished it. Such is the case with *L. palmata* of Willdenow, who quotes for this the *L. crispa non capitata*, Lob. Ic. 242, which is the very identical wooden cut he had just before cited from Dodonæus for the preceding.

*L. quercina*, Linn. Sp. Pl. 1118, has always been a very obscure plant, scarcely known but in the Linnaean herbarium. The synonym of Ray is, at best, doubtful, and the figure given by Sir John Hill, in his cumbrous Vegetable System, is altogether a deception, drawn from description or imagination. What the German writers intend under this name, we have no information. The following is a translation of Linnaeus's account of the *L. quercina*, from his Swedish Travels to Oeland and Gothland.—“*Lactuca* with leaves sinuated in a pinnate form, finely toothed, acute, without prickles at the back, and a smooth stem. Fl. Succ. ed. l. n. 646. Found on the fourth side of the lesser isle of Carlsoen, towards the east. I never had an opportunity of seeing this plant before; and Ray is the only author whose description is sufficiently clear to prove, beyond a doubt, that the *Lactuca foliis quercinis*, of his Hist. Plant. v. 1. 219, is a similar plant. The root of ours is fleshy and obtuse. Stem a cubit high, erect, round, smooth, simple. *Clusters* of flowers terminal, close, narrow and long. *Leaves* like *Sonchus oleraceus*, but having sharper teeth, as if bitten or jagged. *Calyx* nearly cylindrical, scaly, smooth, with scattered rusty spots; the scales erect, furnished at the back with an additional spreading scale.”

*L. canadensis*, Linn. Sp. Pl. 1119, is rightly removed to *Sonchus* by Willdenow, under the name of *pallidus*. The same author, on the contrary, removes the Linnaean *Sonchus tuberosus* to *Lactuca*, calling it *sonchifolia*, and he appears to be right in this instance also, the seed-down being supported by a considerable stalk.

*L. perennis*, Linn. Sp. Pl. 1120. (*Chondrilla cærulea*; Ger. em. 286.), is one of the more handsome species of this genus, on account of its elegantly pinnatifid leaves, and large blue flowers. It grows in the warmer parts of Germany, Switzerland, and France, and is perennial.

—A typographical error in our account of *Hieracium*, column 3, line 6 from the bottom, demands correction. The comma after *remarks*, and the word *these*, both require to be expunged.

LACTUCA, in Gardening, comprehends a plant of the herbaceous annual kind, of which the species usually cultivated in the garden, is the common garden lettuce, *L. fativa*, which has several varieties; the principal of which are;—of the cabbage-lettuce kind, the hardy green, white honey, great admirable white, brown Dutch, small early, white ball, green ball;—and of the coss-lettuce kind, the green coss, white coss, Egyptian coss, spotted coss, black coss, brown Cilicia, green Cilicia, red Capuchin, green Capuchin, large imperial, the Roman, the prince; but the three or four first of the different sorts are the most valuable, and it is of much consequence to have the best kinds employed in cultivation.

*Method of Culture*.—This species, and all the varieties, are raised by sowing the seed annually, at different times, as in February and the three following months, for the summer supply of plants; and in August and the following month, for the autumn, winter, and very early spring supplies. And all these different sowings should be performed upon beds of fine light dry earth, in an open situation, and exposed to the sun. Some of the late sowings may be made under hand-glasses, or in frames or boxes, in order to have the young plants protected from the frosts. Each of the varieties or sorts should be sown separately, and distinct from the others, and be slightly raked into the soil.

It is sometimes the practice to sow them among other low growing crops, such as radishes, spinach, onions, &c. to save ground; but this should always be avoided as much as possible, as a very small portion of land is sufficient for raising large supplies of plants.

For the very early spring use, as open lettuces, the early white cabbage sorts are the most proper; but for the main crops, to remain for full growth, the principal sorts of the coss and cabbage kind must be employed.

When the plants appear, they must be kept perfectly free from weeds, and properly thinned out. As they attain a proper growth, as three or four inches in height, some of the different sorts must be planted out into beds in the open ground, drawing them up carefully, and planting them immediately. This work should be performed by a line and small dibble, in rows, a foot or more distant, with the same space from plant to plant. The quincunx mode is mostly adopted, which affords the most room, and at the same time has the neatest appearance. As soon as the planting is finished, the whole should be well watered; and when the weather is dry, repeated once or twice.

By this planting out the several sorts at different times, at the distance of three weeks or a month, from the early spring till the latter end of the autumn, due successions of good lettuces may be provided. In the summer plantings out, when the weather proves very dry, it is sometimes the practice to plant them in small drills, in order to preserve the moisture more effectually.

After the beds of the different principal sowings have been considerably thinned by the several transplantations that have been made from them, the plants that remain may be set out

to proper distances by the hoe, and left to take their full growth.

As soon as the plants of the main spring and summer crops have attained a pretty full growth, especially those of the cofs kinds, it is necessary to tie the leaves of them up with bafs pretty close, when the plants are quite dry, in order to blanch the inner parts, and render them perfectly crisp, sweet, and tender.

*Mode of Culture in the Winter and very early Spring Crops.*—For this purpose, some seed of the hardy green and white cabbage sorts, and the brown Dutch, and white and green cofs kinds should be sown about the middle of August, and beginning of September, in open situations, when the plants will come up in a week or ten days, and about the end of September; and in October, a parcel of the best plants of each sowing should be planted out in a warm dry situation, five or six inches asunder; and at the latter period some in shallow frames, to be covered with glasses on cold nights, and in bad weather; or under hand-glasses, or in a bed arched over with hoops or rods, to be covered with mats in winter frosts. Under either of the above shelters the plants should have the free air in the day-time in mild dry weather, covering them in cold nights with proper covers, especially after this month; also, in all very cold, and in very wet weather, day or night, particularly those in the frames and under glasses; and those in hand-glasses may have the glasses almost constantly over them in winter, tilting up one side in mild weather, only setting them entirely off in fine mild or dry days; but in sharp frosty weather keeping those under every kind of shelter quite close; allowing also additional covering of mats or litter, when the frost is very intense. Those in the borders may be defended by some light litter; but the covering should never be suffered to remain longer on any of the crops than the bad weather continues, the free air being admitted every mild day.

In this method lettuces may be had the greatest part of the winter and early in the spring, particularly the cabbage sorts: those planted out first will be fit for use in November and December, and the second plantings come in towards Christmas, and being sheltered by the glasses, continue coming in for use till succeeded by the other latter autumn sowings; being careful that, as any are gathered out of the frames or glasses, others be removed from the borders to fill up the vacancies, whereby the glasses may be constantly supplied during the winter season.

It is sometimes the practice where lettuces are intended to be planted in frames late in autumn, for winter use, to have a moderate hot-bed made for their reception, in order that they may be well forwarded in the beginning of winter; and if the heat is continued moderately by aid of linings, allowing plenty of air in mild weather, the plants may be very fine by Christmas, or a little after.

*Mode of Culture in the Winter standing Spring Crops.*—In order to have good lettuces for spring use, some seed should be sown toward the middle and latter end of August, for the plants to stand the winter, some where sown, others transplanted into warm borders, to stand without any other shelter than that of the walls or other fences; and another sowing should be performed about the middle of September, to provide plants for pricking out under frames, to have the shelter of the glasses all winter, as a reserve in case those in the borders are destroyed; where both stand, one may succeed the other as crops. In the first case a quantity of the best plants, when two or three inches high, should be planted out towards the latter end of October, into a south border, under a wall, &c. and in some other warm dry situation,

in rows six inches asunder, and four inches in the rows; or some close under a fourth wall, or other fence, in a foot wide space all the way along, pricking them therein four or six inches distant; as they will have a better chance of standing the winter than those situated more distant from the shelter of the wall. In each method the plants are to remain to take their chance all winter; out of the whole many of them will probably escape the frost; but in very severe weather they may be protected by a light covering of dry long litter, which should be removed again in due time when the frost breaks. In March or April, if they remain too thick, some should be thinned out and planted in another place, in rows twelve or fifteen inches asunder; the crops thus wintered in the open ground, come in for use in April and May, to succeed those sown in autumn, and sheltered occasionally all winter, and will remain good till the spring-own plants are ready for use.

But in the latter case, or those sown in September, to be wintered in frames, they should be planted about the latter end of October, or the beginning of the following month, in rows, from the back to the front of the frame, three inches distant, closing the earth well about each plant, finishing with a moderate watering all over the plants, and putting on the glasses to promote their more speedy rooting afresh, pushing the lights, however, two or three inches down, to give vent to the moist vapour arising from the mould. But when the plants have taken fresh root, and are set to growing, the full air should be admitted every mild dry day, by taking the glasses entirely off, which must be continued throughout the winter season, in all dry mild weather, but putting them on every night in cold or very wet weather; also in the day-time when great rains prevail; and in frosty weather keeping the glasses always on, except in the middle of sunny days, and when the frost is but slight; using also other coverings of mats or long litter over the glasses, and around the sides of the frame, when the frosts are very severe; during the winter keeping all decayed leaves clean picked off; and as the spring and warm weather advance, letting them have the benefit of warm showers. In this way they may be effectually preserved, if those in the open ground should be destroyed by the frost or excessive moisture. About March some of them should be transplanted into a warm situation in the open ground, in rows, a foot asunder, watering them moderately till fresh rooted; leaving a crop remaining in the frames or winter-bed, a foot apart, to stand to cabbage; which will arrive to perfection a considerable time before the transplanted ones, and those that have been fully exposed all winter, are ready. Where frames cannot be spared, a quantity of the plants may be pricked out under hand or bell-glasses in autumn, to stand the winter, either by themselves for a full crop, or some under the hand or bell-glasses that are placed over early cauliflowers, as practised by the London gardeners, planting them round just within the glasses, and managing them as directed for those in the frames; or for want either of a sufficiency of frames or hand-glasses, a quantity may be planted out in October, in four-foot wide beds, in a warm situation, arched over with hoops or rods, to cover with mats and litter in bad weather. In this way they have a better chance of surviving the winter than those fully exposed; and in spring transplanting a quantity, by way of thinning, into other beds, as directed already.

*Manner of sowing Seed.*—With this intention some of the best cabbaged early plants of all the sorts should be chosen, as those of the latter crops rarely run soon enough to ripen seeds perfectly before they are attacked by the autumnal rains

rains and cold, which greatly retard the ripening of the seed. And it is of much importance to have the different varieties intended for seed at some distance from each other, as, when too near together, the farina of the different sorts may mix and fecundate one another, and thereby degenerate plants be produced, instead of such as are perfect in their nature.

The feed usually ripens in August and September, but that of different plants rarely equally together; so that, as it arrives to perfection, the respective stems, &c. of ripe feed should be pulled up or cut off in dry days, and spread upon a cloth, or tied in small bunches across lines in a dry airy place for a week or two, for the feeds to harden and become dry; then beaten or rubbed out, and cleaned from the down and other rubbish, and exposed upon cloths a few days to dry for keeping; being afterwards put up in bags for use, and hung in a dry room or other place.

In general these plants may be considered as annuals and biennials; as those sown in spring and summer attain perfection, run up to seed, and perish the same year; while the autumn sowings stand all winter until the spring following, when they attain perfection, shoot up to seed, and perish root and branch. All the sorts are sufficiently hardy to grow in any good dry common soil, in a free situation open to the sun and air.

In regard to the use of these plants it is principally in salads, when arrived at full growth and cabbaged, that the inner leaves become blanched, crisp, and sweet; and sometimes, also, the young open plants of the cabbage-lettuce sorts are used in winter and spring, till the other general crops arrive at perfection. Young open lettuces are also often used as small salad herbs, sowing them thick in rows, like cresses, &c. and gathering them in the same manner; but this mode is more particularly practised in winter and early spring. They, however, in general, do not eat any way so crisp, sweet, and palatable, as when fully cabbaged. The fully cabbaged-lettuces are also excellent for stewing and for soups, as well as many other culinary uses.

*LACTUCA Marina*, sea-lettuce, in *Botany*, a name used by some authors for the *lichen marinus*, commonly called *oyster-green*.

*LACTUCA Virosa*, in the *Materia Medica*, a species of lactuca, which grows about ditches, banks, borders of fields, and old walls, flowering in July and August. The plant has a strong ungrateful smell, resembling that of opium, and a bitterish acid taste. It abounds with a milk juice, in which its sensible qualities seem to reside, and which seems to have been noticed by Dioscorides, who represents its odour and taste as agreeing with that of the white poppy; and Haller says, that its effects are powerfully narcotic. Dr. Collin, at Vienna, first brought this plant into medical repute, and it has been lately inserted by the College of Physicians at Edinburgh in the catalogue of the *Materia Medica*. Dr. Collin mentions more than twenty-four cases of dropsy that have been treated with success by employing an extract prepared from the expressed juice of this plant, which is stated to be, not only powerfully diuretic, but to promote all the secretions, and to remove visceral obstructions. In the more simple cases, proceeding from debility, doses of the extract, from eighteen to thirty grains a day, proved sufficient to accomplish a cure; but as the disease was inveterate, and accompanied with visceral obstructions, the quantity of extract was increased to three drams; nor did larger doses produce any bad effect besides exciting a nausea. The patients, it is said, continued so strong under the use of this remedy, that it was seldom necessary to em-

ploy any tonic medicines. In Germany, few physicians have, since the year 1771, when Dr. Collin made his experiments with the lactuca, adopted the use of this plant; and hence Dr. Woodville (*Med. Bot.*) takes occasion to observe, that the recommendation of Dr. Collin will be scarcely thought sufficient to establish its use in England.

*LACTUMEN*, from *lac*, milk, in *Surgery*, a name sometimes given to tinea capitis, or the scald head, on account of the white scabs which are formed in this disease.

*LACTUMINA*, from *lac*, milk, little ulcers, or crusty scabs in the skin, chiefly occurring in children at the breast.

*LACUNA*, ANDREW, in *Biography* an eminent Spanish physician was born at Segovia, in Old Castile, in the year 1499. He studied philosophy at Salamanca, and afterwards went to Paris, partly for the purpose of improving his knowledge of the Greek language, and partly for the study of medicine. He took a degree in that capital, but probably only that of master of arts. In 1536, he returned to Spain, and followed the courses established in the colleges of Alcala, Henarez, and Toledo, in the latter of which he received the honours of the doctorate. After this he immediately repaired to the Low Countries, in consequence of a command from the emperor Charles V. and he passed the greater part of his life at the court of that monarch. In 1540, he went to the imperial city of Metz, and resided there five or six years, rendering great services to the citizens during the prevalence of an epidemic pestilence; and by his influence, thus acquired, he contributed to strengthen their adherence to the church of Rome and to the emperor. He visited Italy, Germany, and France again, where he received many honours from the learned corporations, and at Rome was created count palatine, and knight of the order of St. Peter. He died in his native country in the beginning of the year 1560.

He proved himself a learned critic by the corrections and commentaries on the works of Dioscorides, and on many parts of those of Hippocrates, Aristotle, Galen, &c. His own works are numerous, consisting of a treatise on anatomy; an account of the epidemic at Metz; a life of Galen, an epitome of his works, and notes on the labours of his translators, &c. He likewise published a treatise on gout, on excrescences in the neck of the bladder, and on diet, and an epistle to Cornaro; and he translated the works of Dioscorides into Spanish. Eloy. Dict. Hist. de Med.

*LACUNE*, in *Anatomy*, small cavities in some of the mucous membranes, in which a secretion of mucus is carried on; as in the urethra of the male and female. See a description of them in those organs under *GENERATION*.

*LACUNARS*, in *Architecture*, are the panels or coffers formed on the ceilings of apartments, and sometimes on the soffits of the corona of the Ionic, Corinthian, and Composite orders.

In the temple of Minerva at Athens, the lacunars are placed immediately above the frieze within the portico, and formed with a single recess, having an ovolo at the top, which moulding terminates the vertical plane sides, and the horizontal heads of the lacunars. The lacunars are not square, but longer in the longitudinal than in the transverse direction of the building.

In the temple of Theseus at Athens, the lacunars are formed above the frieze, in two rows, between large beams which reach from the rear to the front of the pronaos; their figures are of a square horizontal section, and have only a single recess upwards, with an ovolo above the recess. The side of the square of each coffer is about one-fifth part of the diameter of the column, and their recesses upwards half the side

of their square. The distance between the beams is equal to the breadth of the antæ at the bottom, or nearly equal to the diameter of the columns. The beams are not regulated by the columns, but placed at equidistant intervals, to receive the two rows of lacunars or coffers. Within the temple or cella, the beams reach transversely from side to side; but without, and under the soffit of the pronaos, they extend longitudinally from the front to the rear of the pronaos, and the lacunars in the same direction.

*Temple of Minerva at Athens, Plates IV., VII.*—The lacunars are placed above a frieze highly decorated with historical figures.

In this they are formed in one recess, with a moulding ovolo at the top of the recess, or the farthest extremity of the sides. The lacunars are not square, but longer from front to rear of the portico, than in the transverse direction of the building. Chap. ii. *Plate XVIII.*

In the soffit of the temple of Pandrosus at Athens, the lacunars are formed immediately above the architrave, each into three recesses, with an ovolo at the bottom of each, nearly as broad as the perpendicular surface. The whole depth of the recess is nearly half the side of the square of the lower part of the said recess. Each part diminishes gradually in breadth in a sloping straight line, till the side of the square of the upper part is so contracted as to be only half that of the lower. Each succeeding third part diminishes regularly in altitude, so that accounting the bottom the first, the altitude of the second, or the one next above, is something less, and the third about the same quantity less than the second. Each ovolo is something less in height than the vertical surface below it, and has the same ratio to its respective surface.

The cella of the temple of Vesta at Rome is surrounded with a circular colonnade. The ceiling of the portico has a double row of lacunars, being two in the breadth of the portico. The lacunars approach as nearly to a square as is consistent with their diminution, formed by radiations towards the centre of the building, and are constructed in two recesses. The greatest breadth of the outside lacunar is about nine thirteenths of the diameter of the columns. The whole depth of the recess upwards is about one-seventh of a diameter. The radiating sides of the lacunars or coffers are in vertical planes, and the other two sides of each are vertical cylindrical concentric surfaces. The greatest breadth of the upper recess is about two-thirds of the lower. The hollow of this recess is occupied by a rose of a circular form. The recess or cradle vaults of the temple of Peace at Rome are arched and enriched with octagonal lacunars, each formed in three recesses, which diminish in their margins as they recede upwards. Between the octagonal lacunars are others of a square form in a diagonal position. The ceiling of the middle of the chapel of the said temple is comparted with hexagonal and rhomboidal lacunars.

The lacunars of the arch of Titus at Rome are each square, the side of which being about three quarters of the diameter of the column.

The entablatures of the Ionic, Corinthian, and Composite orders, are generally enriched with lacunars between the moldings.

LACYDES, in *Biography*, a Greek philosopher, and native of Cyrene, was a disciple of Arcelaus, whom he succeeded in the academic chair. He was brought up in very humble circumstances, but acquired great reputation by intense application to his studies, and a graceful elocution. He was highly esteemed by king Attalus, who gave him a garden where he might devote himself to study, and to the instruction of others: this was afterwards known by the

name of the Lacydean garden. Attalus wished Lacydes to come and reside at his court, to which he respectfully replied, that the portraits of kings should be viewed at a distance. He taught his disciples never to be hasty in their judgments, and never to speak positively. Having taught philosophy twenty-six years, he resigned the employment to his scholars Telesus and Evander, in the second year of the 141st Olympiad. In old age he disgraced himself by giving a favourite goose a most magnificent funeral, and he fell a victim to excessive drinking. Bayle. Enfield.

LAD, in *Geography*, a town of Moldavia, on the Reut; 36 miles E. N. E. of Stephanowze.

LADA, in *Botany*, a name given by some authors to the plant which produces the common black-pepper.

LADAK, or LAUTA, in *Geography*, a province of Thibet, bounding on Cashmir towards the west, towards the east on Ngari, and towards the north on the Uzbeks. See THIBET.

LADANUM, in *Botany*. See CISTUS.

LADANUM, or *Ladbanum*, in *Pharmacy*, a gumitious or a resinous matter, oozing out of the leaves of a shrub called *cistus creticus*, or *ladanifera*, which is very common in the hot countries of the Levant, particularly in Candia, and of which there are various kinds. The shrub is also plentiful in Spain, though no ladanum is brought from thence.

Dioscorides says, they gather the ladanum by means of goats, which, browsing on the leaves of this shrub, return to the stable with their beards loaded with a fat substance, which the peasants rake off with a kind of combs made for that purpose. This matter they thus collect into lumps, and, as it is mixed with the goats' hair, and other impurities, call it *ladanum in the beard*, or *natural ladanum*. Others are said to draw cords over the leaves, and other parts of the shrub; and, scraping off what had stuck to the cords, they make up the ladanum into little balls.

Tournefort assures us, that the common way of gathering the ladanum at this time is, by brushing it off the leaves with a sort of whip, composed of many lashes, or straps; after it is scraped off the straps, they make it into cakes of different sizes.

Pietro delle Valle tells us, he was informed by the Indians, that ladanum is formed like dew, and falls from heaven like manna; that it is gathered on the leaves of a plant a palm and a half high; that, after gathering, they boil it, by which means it becomes soft, like wax.

Bellonius says that this juice is collected by lightly brushing the shrub, in the summer heats, with a kind of rake, called in Candia "Erga-tiri," having several straps or thongs of leather fixed to it instead of teeth; the metuous juice adheres to the thongs, and is afterwards scraped off with knives, and formed into regular masses for exportation.

There are two sorts of ladanum in the shops: the best, which is very rare, is in dark-coloured masses, of the consistence of a soft plaster, which becomes still softer on being handled. The other is in long rolls, coiled up and much harder than the preceding, and not so dark. The first has commonly a small, and the last a very large admixture of fine sand, blown upon the juice from the sandy soil where it is found.

Ladanum has been sometimes exhibited as a pectoral and astringent in catarrhal affections, dysenteries, and several other diseases, but it is at present wholly employed in external applications and perfumes. The soft kind, which has an agreeable smell, and a lightly pungent bitterish taste, makes an useful ingredient in the cephalic and stomachic plasters of the

the snags. Rectified spirit of wine dissolves nearly the whole of the pure ladanum into a gold-coloured liquor. Water acquires by infusion much of its smell and taste: and, by distillation in water an essential oil arises, leaving a brittle almost insipid resin and a pale-coloured liquor, which, inspissated, yields a weakly bitterish extract. Heat soon destroys the specific flavour of this juice. Lewis.

**LADANUM**, *Liquid*, more properly called *clear* or *purified* ladanum, is a preparation of the natural ladanum, by melting and purifying it from the hairs, &c.

This hardened is sometimes sold for a sort of black ambergris.

**LADDER** is *Heaven*, in *Botany*. See *LILY* of the *Valley*.

**LADDERS**, *Scaling*, in the *Military Art*, are used in escalade. They are of various sorts; some are of ropes and some of wood; some are made of several joints, so as to be capable of being put together, and to form ladders of different length, according to the service required. There is a sort used in England, much of the same make as the common ladders, except that the steps turn about wooden pegs, so that the poles may be brought near each other, or to shut like a parallel ruler. These are very convenient for carriage.

**LADDERS**, in a *Ship*, derive their names from the several hatchways or other parts where they are situated. Besides these, there are some of a particular construction, as the accommodation-ladder, and the quarter-ladder. The accommodation-ladder is a sort of light staircase, occasionally fixed on the gang-way of the admiral, or commander in chief of a fleet. It is furnished with rails and entering ropes, covered with red baize, and the lower end of it is kept at a proper distance from the ship's side by iron-bars or braces, to render the passage more convenient to those who enter or leave the ship. Quarter-ladders, are two ladders of rope, depending from the right and left side of the ship's stern, whereby to descend into the boats which are moored astern, in order to bring them up along-side of the ship, or to use them for any other occasion.

**LADDER Ways**, the openings in the decks where the ladders are placed.

**LADENOEPOLI**, in *Geography*, a town of Russia, in the government of Olonetz; 56 miles S. of Petrozavodsk. N. lat. 61° 56'. E. long. 33° 50'.

**LADEN**, in *Sea Language*, denotes the state of a ship when she is charged with a weight or quantity of any sort of merchandize or other materials, equal to her tonnage or burthen. If the cargo with which she is laden be extremely heavy, her burthen then is denominated by the weight of the goods; if it be light she carries as much as she can stow, so as to be fit for the purposes of navigation. A ton in measure is generally estimated at 2000lb. in weight, and therefore a vessel of 200 tons ought to carry a weight of 400,000lb. when the matter of which the cargo is composed is specifically heavier than the water in which she floats.

**LADEN**, in *Bulk*, denotes the state of being freighted with a cargo, which is not in casks, boxes, bales, or cases: but lies loose in the hold, being defended from the moisture or wet of the hold, by a number of mats and a quantity of dunnage. Such are usually the cargoes of corn, salt, or such materials.

**LADENBURG**, in *Geography*, a town of Westphalia, in the bishopric of Osnabruck; nine miles S.S.E. of Osnabruck.—Also, a town of the duchy of Baden; six miles E. of Mannheim. N. lat. 49° 27'. E. long. 8° 40'.

**LADETSCH**, a town of Bohemia, in the circle of Casslau; 12 miles S.S.W. of Casslau.

**LADJA**, in *Hindoo Mythology*, a being produced by Brahma, similarly with Lalha: a being which Brahma, or the creative power of the deity, produced from his loins when peopling the world. Lalha is a personification of appetite or passion, and the word in Sanscrit has, as in many other languages, a libal meaning, indicating the source of the being thus produced. On that occasion Kama, a personification of love or desire (see *KAMA*), sprung from his heart in the form of a beautiful female, and Brahma, locking on her with amorous emotions, was informed by the Munis, (*See MUNI*), that she was his own daughter: he shrunk back, and Ladja, a personification of shame, a bustling virgin, was produced. Brahma, deeming his body defiled by its emotive toward Kama, purified it by partial metamorphosing it into ten females, who were respectively espoused by the Munis.

**LADKIEH**, in *Geography*, a town of Asiatic Turkey, in Caramania, anciently Laodicea; 20 miles W. of Cegai.

**LADING**. See *BILL* of *Lading*.

**LADISLAUS I**, in *Biography*, king of Hungary, son of Bela I. born in 1041, was a martial prince, and joined his brother Geysa in a war against Solomon, whom he was the chief cause of defeating, at the bloody battle which deprived him of his crown, and placed it upon the head of Geysa. Upon the death of the latter in 1078, Ladislaus was chosen to succeed him. He immediately attacked and defeated the rebellious Wallachians, and annexed to his dominions Dalmatia and Croatia, through the gift of his sister, who was widow of the last king of Dalmatia. He reduced the Bohemians who had revolted, expelled the Huns, and conquered part of Bulgaria and Russia. He defeated also the Tartars, and having made his dominions secure on all sides, he studied to render them flourishing and happy by the arts of peace: he encouraged commerce, and published an improved code of laws. He built several new churches, and made considerable preparations for joining in the first crusade, when in an expedition into Bohemia he was attacked with a disease, which put an end to his life in the year 1095, after a glorious reign of seventeen years. He was distinguished for piety as well as valour, and was canonized in 1198 by pope Celestine III. Univer. Hist.

**LADISLAUS III**, king of Hungary. The second prince of this name reigned but a few months, and did nothing worthy of record. The third Ladislaus, the subject of this article, surnamed Chun, came to the throne in 1272, after the death of his father, Stephen IV. He obtained the name of Chun from the barbarity of his disposition. Soon after his accession to the throne, he, in conjunction with the emperor Rodolph, defeated the Bohemian king Othogar, who was slain in battle. After this success, he gave himself up to all manner of voluptuousness; divorcing his own wife, that he might indulge his passion with women of the Tartar nation of Cumans. His general conduct was so base, and his oppression of the Christians so enormous, that the pope, at the desire of the principal people of Hungary, excommunicated him: upon which he feigned a sincere repentance, and built an hospital for strangers. His total neglect of the government, and the disaffection of his subjects, invited the incursions of the Tartars, by whom Hungary was so dreadfully desolated, that, for want of beasts, men, and even those of the higher ranks, were obliged to draw the plough. Hence the Hungarian proverb, "The ploughs of Ladislaus." After a second invasion, which Ladislaus took no measures to repel, he was stabbed, while sleeping in his tent, by some of the Cumanian women in whom he confided, but whom he had offended. Univer. Hist.

**LADISLAUS IV**, king of Hungary, also king of Poland, under the title of Uladislavus V., was son of Jagello, or

Uladiſlaus IV., whom he ſucceeded on the Polish throne in 1435, being then only in the ninth year of his age. He was elected king of Hungary in 1440. As the famous crown of St. Stephen was in poſſeſſion of the late queen, he was crowned with a diadem taken from the cheſt containing the relics of that ſainted monarch. He declared war againſt the Turks, and employed as his general John Huniades, who was very ſucceſsful in the cauſe. Ladiflaus made peace, which gave much diſſatisfaction to the pope, and other Chriſtian princes; ſo that he was induced to break it. A battle ſoon after ensued, in which he loſt his life at Varna, in the year 1444. His death occaſioned the complete ruin of his army. Univer. Hiſt.

LADISLAUS V., king of Hungary, was born in 1440, and ſucceeded to the crown in 1444, when he was only in the fifth year of his age. He was, at this time, at the court of the emperor Frederic III.; and it was not till 1452 that he was reſtored to his country. It was agreed that, during his minority, Hungary ſhould be governed by John Corvin, ſon of Huniades; Bohemia by George Podiebrad; and Auſtria by Ulric count of Ciley, the king's uncle, who was appointed guardian of his perſon. The count endeavoured to ſupplant John Corvin, but in vain; and he obtained great honour by the defeat of the Turks before Belgrade. At the death of John, the government was transferred to his ſon Ladiflaus, to the great mortification of the count of Ciley, who endeavoured to procure his aſſaſſination; but he was himſelf killed at Belgrade by the friends of that family. In 1457, Ladiflaus went to Prague, in order to celebrate his nuptials with Magdalen of France, daughter to Charles VII.; but in the middle of the ſeſtivities, he was taken ſuddenly ill, and died, not without ſuſpicion of poiſon. Mod. Univer. Hiſt.

LADISLAUS VI., king of Hungary, ſon of Caſimir IV. of Poland, was choſen king of Bohemia in 1470, and was ſoon involved in a war with Matthias king of Hungary, which was terminated by a peace in 1475. At the death of Matthias in 1490, Ladiflaus was elected to ſucceed him. He had, however, to make his way to the throne againſt the hoſtile oppoſition of his competitors, one of whom was his own brother. At length he was quietly ſeated; but being of an indolent and pacific diſpoſition, he was ill fitted to contend with the diſorders which haraſſed his kingdom; and from his great bulk and inactivity, he acquired from his ſubjects the appellation of an *ox*. The Turks having threatened Hungary, he was, during his whole reign, conſtantly at war with the Turks, and other neighbouring powers. Ladiflaus, though not warlike, was attentive to the duties of his high ſtation, and employed much time in collecting all the Hungarian laws, and the decrees of the monarchs, into one body, which has ever ſince formed the baſe of the conſtitution and jurisprudence of the country. He died in 1516. Univer. Hiſt.

LADISLAUS, kings of Poland. See ULADISLAUS.

LADISLAUS, or LANCELOT, king of Naples, called the liberal and victorious, ſucceeded his father, Charles Duras, in 1386. He was before count of Provence and king of Hungary. He obtained the latter crown in 1403, during the impriſonment of Sigismund, who compelled him to return to Italy. On the death of his father, he was oppoſed by Lewis II. duke of Anjou, which occaſioned ſome bloody wars. The pope at firſt eſpouſed the cauſe of Lewis, but afterwards took the part of Ladiflaus, who, however, marched againſt Rome, and having taken it, turned his arms on the Florentines, whom he compelled to flee for peace in 1413. He died in 1414, aged 38, being poiſoned, as it was reported, by his miſtreſs, who had been bribed to

perpetrate the bloody deed by the Florentines. Univer. Hiſt. Tablettes Chronologiques, par Du Frefnoy.

LADIZIN, in *Geography*, a town of Poland, in the palatinate of Braclaw; 14 miles S. of Braclaw.

LADLE of a Gun, the inſtrument wherewith the powder is put into the piece.

It is made of a plate of copper bowed in form of a half-cylinder, rounded at one end, the other being fixed upon a long ſtaff: this filled with powder, the gunner carries, with his left hand under the end of it, to keep the powder from falling out, till he enters it in the muzzle of the piece; when he has carried the powder home to the charged cylinder, he turns the ladle, that the powder may fall out, and withdraws it.

Lades are fitted to the bore of each gun, and hold powder ſufficient for the charge.

Small lades, with ſhort handles of wood, are alſo uſed in filling the fuzes of ſhells, or any other compoſition for filling the caſes of rockets, &c.

LADLE-Boards, thoſe boards diſpoſed on the circumference of the water-wheels of over-ſhot mills; forming hollows, or receptacles, not unlike lades, to receive the water that falls upon the wheel. See Water-WHEEL.

LADOCO, *Los Cados* is, in *Geography*, mountains, which commence in Portugal, and are continued into Spain, ſeparating Galicia from the Asturias.

LADODA, a town of Hindooſtan, in the ſubah of Agimere; 20 miles S.E. of Roepnagar.

LADOGA, Nov, a town of Ruſſia, on the ſouth coaſt of the lake Ladoga; 56 miles E. of Petersburg N. lat. 60° 2'. E. long. 21° 44'.

LADOGA, or *Ladoskoi*, Lake, lies in the government of Vyborg, between the gulf of Finland and the lake of Onega; its ſouth-weſt extremity lying about 30 miles eaſt from Peterburg. In ancient times it is ſaid to have been called Nebo. Being in length 175, and in breadth 105 verſts, it is reckoned one of the largeſt lakes in Europe. It produces a great number of ſeals. On account of the perilous ſtorms to which it is liable, and the ſeveral ſand-banks that are ever ſhifting their poſition, Peter the Great, in 1718, cauſed the famous Ladoga canal to be dug along its ſhore, from the Volkhof into the Neva. It was begun by order of Peter, and finiſhed under the reign of the empreſs Anne. This canal is 104 verſts long, 10 ſajenes broad, 1½ ſajene deep, and has 25 fluices. By the Neva the Ladoga is connected with the Baltic; by the Svir, with the Onega; and by the Volkhof, with the Ilmen. Into the canal flow the rivers Lipke, Naſa, Sheldika, Lava, and Kabona; into the lake the rivers Pasha, Sias, Oiat, &c.; whereas the Neva alone runs out of it. Both ſhores of the lake belong to Ruſſia, which has every where a flat coaſt and a ſandy beach. On this ſhore it has alſo a few low fiſhery iſlands, and a ſandy bottom. That part of the northern ſide which lies in the government of Olonetz has marble on its eaſt, whence ſome of theſe beautiful kinds of Finnish marble are brought to St. Peterburg. As the bed of this lake, for a great extent, is in the loweſt part of the country, it receives, beſides the above-mentioned rivers, the waters that come from the Alum hills; all of which have no other outlet than the Neva. Tooke's Ruſſ. Emp. vol. i.

LADONIS, in the *Materia Medica of the Ancients*, a name given by ſome to the laurus or bay-tree. We find the word in a compoſition preſcribed in Galen, from the works of ſome of the empirics of his time; but it never was uſed by the more regular authors.

LADOS, in *Geography*, a ſmall iſland in the Eaſt Indian ſea. N. lat. 6° 11'. E. long. 99° 40'.

LADRE, in the *Manege*, denotes *dull*. See *Horse*.

LADRONES, MARIAN, or *Mary-Anne*, *Islands*, in *Geography*, a group of islands in the North Pacific ocean, forming a chain of 200 leagues, and occupying a space of about 450 miles in extent. Magellan, who discovered this archipelago in 1521, imposed on them the name of Ladrones, (*Thieves* or *Robbers*,) because the natives, like those of many other islands, who had no idea of the exclusive right of property, manifested a disposition to pilfer, and a considerable degree of address in the execution of their designs. These islands were also called "Isas de las Velas," from the great number of sailing craft which came from these islands to meet ships, when they presented themselves there for the purpose of anchoring. Towards the middle of the 17th century, in the reign of Philip IV. of Spain, these islands were called the "Marians," in honour of Mary-Anne, the queen of Philip. In 1564 or 1565, Andreas Miguel Lopes Legaspi took possession of them in the name of the crown of Spain; but he neglected them as unworthy of his attention, and pursued his voyage to the Philippines. The islands of Ladrones were forgotten till the zeal of a celebrated Jesuit, Sanevares, interested the devotion of queen Mary-Anne of Austria, regent during the minority of her son Charles II., and excited her to cause the gospel to be carried into these islands, which Magellan had found means to annex to the possessions of Spain, by discovering a new route, that eluded the ridiculous line of demarcation established by the see of Rome, in the plenitude of its power. In 1688, the Spaniards presented themselves at the Mary-Anne islands, with the cross in one hand and the sword in the other; and with these two weapons, which lent one another mutual aid, their pretended right to the possession of these islands could not fail to be acknowledged. They had no difficulty in making themselves masters of Guahan or Guaham (now called Guam), the principal of these islands, and the most southern of the Archipelago; and by degrees they subdued all the others. Pigafetta, who accompanied Magellan, describes the people of these islands as naked, their hair and beards long, tall, and well-proportioned, with an olive complexion. They coloured their teeth black, like the inhabitants of the Pelew islands; and in their manners and customs they resembled one another. Till the arrival of the Spaniards, the inhabitants of these islands considered themselves as the only men in the world, being assured that the first man was made of a piece of rock taken from Funá, a little island near Guam; but, according to others, he was made of earth in the latter island. When they were visited by the Spaniards and Dutch, they inferred that these strangers were brethren, who had lost the primitive Guamefe language. In colour, speech, manners, and government, they much resemble the Tagals, or people of the Philippines, before the Spanish conquest. They were then very populous; Guam, which is 40 leagues in circuit, having 30,000 inhabitants. The women employed themselves in dyeing their teeth black, and their hair white. The nobles were treated with great respect, and thought it criminal to connect themselves in marriage with a common girl; nevertheless, the people were not enslaved, or even subjects, though they treated their nobles with great reverence.

Their houses were divided into four apartments, separated by palm-leaves. In their absolute independence each man avenged his own quarrel; but though wars were frequent, they were not sanguinary; the loss of a man or two deciding the battle. Their magicians invoke the anitis, or the dead, whose skulls were preserved in the house; and they manifest an anxiety lest the anitis, or ghost, should disturb their sleeping, or nocturnal repose. Although Guam is the largest of

these islands, Tinian has attracted the greatest degree of attention in consequence of the romantic description given of it in Anson's voyage. (See GUAM and TINIAN.) The number of these islands has been differently stated from 9 to 16; but it does not appear that above three or four are inhabited. Their sailing vessels, called *proas*, evince considerable skill in naval architecture. For an account of them, see the article BOAT. La Perouse leads us to conclude that these islands are volcanic; but their natural history is little known. They cultivate various seeds and fruit, and particularly the bread-fruit. For their productions of this kind, see TINIAN. In Sir George Staunton's account of the embassy to China, we have some information of a recent and authentic kind with respect to these islands. The grand Ladrone he represents as a high-peaked island; and he mentions another near it, whose summit is somewhat lower and more level. The latitude of the grand Ladrone appeared to be 21° 52' N., and the longitude 113° 36' E. of Greenwich. The latitude of another island, called *Chookteho* was 21° 55' N., and its longitude 113° 44' E. The observations from which these latitudes and longitudes are deduced were carefully made, and therefore they may be deemed correct; though they differ from those stated by other geographers. The margins, or rocks, of the Ladrone islands next the sea are of a black, or dark brown colour, owing to the action of the salt-water; and the spray and dashing of the waves have corroded their surface, so as to give them a honey-comb appearance. Some springs are found on these islands; and the water is neither brackish nor chalybeate, nor in any respect mineral in its taste. The soil upon the surface appears to be of the same nature with the component parts of the rocks below, and, indeed, is merely the upper layer of the rock, decomposed and pulverized by the joint action of the sun and rain in a succession of ages. The rock consists of a mixture of clay, calc of iron in a small proportion, and a great deal of siliceous earth and mica. The sea all round is of a dirty-yellowish muddy colour, and of no great depth. The bottom is mud and clay.

The Ladrones, and clusters of islands between them and the southern extremity of China, are so near to each other, and to the main land, and are also so broken, as well as so irregular in their form and position, as to appear like fragments, disjointed from the continent, and from each other, at remote periods, by the successive violence of mighty torrents, or in some sudden convulsions of nature. These fragments have now a very barren and unpromising aspect. In particular spots, however, there are some scattered patches of pleasing verdure; but, in general, little better than naked rocks appear; and scarcely ever a tree or shrub is visible among them. These islands serve chiefly as retreats for pirates, and for the temporary abode of fishermen. To the north of the Ladrones are many small islands, extending to Todos los Santos, N. lat. 30°; those further to the N. belonging to Japan. This group may either be arranged, says Pinkerton, among the Ladrones, or night, perhaps, admit of a distinct appellation. For a more ample account of the Ladrones, we refer to the Supplement of De Brosse, vol. ii. p. 492, and to the article TINIAN.

LADRONES, three small islands in the Pacific ocean, on the coast of Veragua; 8 miles S.E. of Cape Boruca, N. lat. 8° 20'. W. long. 83° 16'.

LADROON, a river of Africa, which runs into the Indian sea, S. lat. 22° 36'.

LADVOCAT, JOHN BAPTIST, in *Biography*, a man of letters in France, was born in 1709. He was, at the usual age, admitted a member of the society of Jesuits, and for

some time occupied the cure of Domremi, the birth-place of the celebrated Joan of Arc; but in 1740 he was appointed royal professor at the Sorbonne, and in two years after he was elected librarian. The good duke of Orleans having founded a Hebrew professorship in the Sorbonne, Ladvocat was appointed, in 1751, to fill that office, which he kept till his death, in the year 1765. His works are "A Geographical Dictionary;" "An Historical Dictionary;" "A Hebrew Grammar," and several theological tracts. He is represented as remarkably mild, humane, and undistinguished in his manners.

LADVOCAT, LEVIS FRANCIS, a philosophical writer, and dean of the chamber of accounts at Paris, where he died in 1735, in the ninety-first year of his age. As an author, his principal work is entitled "Entretiens sur un nouveau Systeme de Morale et de Physique," which abounds in solid reflections, and well digested reasonings. Some objections being made to the principles contained in these conversations, Ladvocat, in 1728, replied by publishing "A new System of Philosophy founded on the indisputable Nature of Things, compared with the Opinions of the ancient Philosophers relating to the first Principles of Nature, &c.:" to which is added a treatise on the nature of the soul, and the existence of God. Ladvocat was an able magistrate, and a good man. Mereri.

LADY, in *Geography*, a town of Russia, in the government of Smolensko, and before the late dismemberment of Poland, a Russian frontier town.

LADY'S *Island*, an island in the Atlantic, near the coast of S. Carolina, in America, between Port Royal island and St. Helena. N. lat. 42° 30'. W. long. 80° 32'.

LADY'S *Bed-Straw*, or *Cheese-Rennet*, in *Botany* and the *Materia Medica*. See GALIUM.

LADY'S *Bower*. See CLEMATIS.

LADY-BIRD, in *Zoology*. See HEMISPHERIA, and SCARABÆUS. *Coccinilla punctata*.

LADY-CHapel, a name invented by modern architects and virtuosi to signify the chapel which is generally found in our ancient cathedrals behind the screen of the high altar. It is so denominated from its being generally dedicated to the blessed Virgin Mary, called *Our Lady*.

LADY'S *Comb*, in *Botany*. See SHEPHERD'S *Needle*.

LADY'S *Cushion*. See SAXIFRAGE.

LADY-DAY, in *Laws*, the 25th of March, being the Annunciation of the Holy Virgin.

LADY'S *Finger*, in *Botany*. See ANTHYLLIS.

LADY'S *Mantle*. See ALCHENILLA.

LADY'S *Seal*. See TAMUS.

LADY'S *Slipper*. See CYPHOPEDUM.

LADY'S *Smock*, the common name of a perennial weed often met with in pasture grounds. The stalk is upright, found, and smooth, the leaves are winged, with the lobes of the lower ones roundish, and those on the stalk oblong. The flowers are large, handsome, and white, or purplish, consisting of four obtuse veined petals. The seeds are contained in erect compressed pods, about an inch in length, divided into two cells, which, when ripe, burst with a touch, and throw out their seed to a considerable distance. It has sometimes the vulgar names of cuckow-flower, Canterbury-bells, &c.

LADY'S *Tracts*. See TWYBLADE.

LADY of the *Thistle*. See THISTLE.

LADY, *Presentation of our*. See PRESENTATION.

LADYKIRK, in *Geography*, a town of the island of Ronaldsna. N. lat. 58° 38'. W. long. 2° 49'.

LÆLIUS, CAIUS, in *Biography*, a noble Roman, the particular friend of the first Scipio Africanus, accompanied

that commander to Spain, and was instrumental in the capture of New Carthage. When Spain was reduced under the Roman power, Lælius was sent by Scipio to treat with Syphax, and after this he was employed to ravage the coast of Africa. In conjunction with Massinissa, he defeated Syphax, and brought him prisoner to Rome. He commanded the Italian horse at the battle of Zama, and had a considerable share in the success of the day. He was made consul in the year 160 B. C.

LÆLIUS, CAIUS, surnamed *Sapientis*, supposed to have been the son of the preceding, was equally distinguished with the former by his friendship with the second Scipio Africanus, so that Cicero represents him in his treatise "De Amicitia," as explaining the real nature of friendship with its attendant pleasures. In this work, which is known to every well educated youth, Lælius appears as the chief speaker. He was an eminent orator, and a successful cultivator of polite literature. He was signalized by his prowess in the war with Spain, but is chiefly celebrated by the civil honours to which he attained. His oratory is described as of the mild and elegant kind. He was a member of the college of augurs, and pronounced one of the most famous orations in that capacity. He was consul in the year B. C. 140. When his friend Scipio quitted all concern in public affairs, Lælius accompanied him to his country retreat, preferring the pleasures of retirement and friendship to the honours of the world. He is supposed to have had a share in the composition, or, at least, in the correction, of Terence's comedies. His modesty, humanity, and the manner in which he patronized literature and learned men, are as illustrious as the greatness of his mind, and the integrity which he displayed as a statesman. Univer. Hist.

LÆNA, among the *Ancients*, a thick, shaggy, upper garment. See CHLENA.

LAER, PETER VAN, in *Biography*, a landscape, cattle, and conversation painter, known in Italy by the name of Bamboccio, from the nature of the subjects he frequently painted during a long residence at Rome, such as vintagerevels, drolleries, quarrels, mummeries, &c. which are termed by the Italians Bambocciate. He was a native of Laeren, near Narden, was born in 1613, and being endowed with excellent faculties of perception and imitation, he practised the art he adopted with very great success. His hand and his imagination were equally rapid; and so readily would the former execute the dictates of the latter, that he rarely found it necessary to make previous studies for his pictures; but sketching slightly the subject on his canvass, he finished the work without more delay. He had the great advantage of possessing an excellent memory, and if he considered any object with an intention to insert it in a picture, it became so imprinted in his mind, that he could represent it with great truth without its being placed again before his eyes.

His pictures are of a small size, but very pleasingly executed, with an excellent tone of colour.

In the latter part of his life he was severely tormented with an asthma, of which (not being endued with patience enough to bear his miseries tranquilly), he contrived to rid himself by drowning, in the 60th year of his age.

LÆERTA, in *Natural History*, a name given by authors to a species of vespa or wasp, whose sting is said to be fatal; but this is an erroneous opinion. This wasp is larger and longer bodied than the common kind, but smaller than the hornet. It seems of a very irritable disposition, attacking animals of any kind that come in its way.

LÆET, JOHN DE, in *Biography*, director of the East India company, was born at Antwerp, where he died in

1649. He was a great proficient in the languages, and composed or edited several works relating to geography and civil history, as "Novus Orbis;" "Historia Naturalis Brasiliæ;" "De regis Hispaniæ Regnis et Opibus;" "Reipublica Belgarum;" "Gallia;" "Turcici imperii Status;" "Perficiæ imperii Status." These works are still in considerable repute, as well on account of the historical and geographical information which they contain, as on account of the great beauty of the Ezevir types. They are known generally under the name of the Republicæ. Laet gave a new edition of the works of Vitruvius, enriched with notes of various critics. Laet's account of America, which is found in his "Novus Orbis," involved the author in a controversy with Grotius respecting the origin of the inhabitants. It has been much used by more modern geographers.

LAETIA, in Botany, named by Loeffing, in memory of John de Laet of Antwerp, who published a Latin history of America in folio, in 1633, dedicated to king Charles I. of England. Haller speaks with respect of his botanical remarks, as throwing light upon the plants of Maregrave, and tending to reconcile his descriptions with those of Clusius and the Spanish botanists.—Linn. Gen. 267. Schreb. 355. Willd. Sp. Pl. v. 2. 1163. Mart. Mill. Dict. v. 3. Juss. 293. (Guidonia; Browne Jam. 249. Linn. in Loell. t. 190. Thammia; Browne Jam. 245.)—Clas and order, *Polyandria Monogynia*. Nat. Ord. *Tiliaceæ*, Juss.

Gen. Ch. Cal. Perianth inferior, of five oblong, concave, reflexed, coloured, withering leaves. Cor. either wanting, or of five petals. Stam. Filaments numerous, capillary, rather shorter than the calyx; anthers roundish. Pist. Germen superior, oblong; style thread-shaped, longer than the filaments; signa capitate, depressed. Peric. Capsule roundish with three or four angles and as many furrows, fleshy, of one cell and three or four valves finally recurved. Seeds numerous, angular, each clothed with a pulpy tunic.

Eff. Ch. Corolla of five petals, or wanting. Calyx inferior, of five leaves. Capsule fleshy, of one cell, and three or four valves. Seeds numerous, with a pulpy tunic.

Obs. We have endeavoured to profit by the observations of Swartz, compared with those of Browne and Loeffing, in order to give a just idea of the fruit, of which we regret having never examined any specimen. Neither is any sufficient representation of it extant.

1. *L. apetala*. Linn. Sp. Pl. 733. Jacq. Amer. 167. t. 1c8. Swartz. Obs. 219. Loell. It. 190 n. 65.—Petals none. Stalks axillary, three-flowered. Leaves elliptic-oblong, obtuse, minutely serrated, smooth and shining.—Gathered by Jacquin in woods at Carthagena, South America, flowering in April and May, bearing fruit in August. A tree 20 feet high, throwing out spreading branches from the very bottom of its trunk. Leaves about the ends of the short alternate tapering lateral shoots, stalked, above an inch in length, elliptic-oblong, or obovate, obtuse, smooth and shining, very minutely serrated. Flowers white, compared by Jacquin to those of Hawthorn, both in appearance and scent, standing mostly three together, on solitary axillary stalks, not half so long as the leaves. Fruit, according to Jacquin, ovate with three blunt angles, the size of an olive, generally found more or less eaten by birds or insects, but he seems to speak of it as smooth; Loeffing describes it as yellow and downy, nearly globose, with four obscure angles and as many furrows. We are unable to determine whether these writers both speak of the same species, though such is the general opinion. Loeffing found his near Comana.—Lamarck suspects the *L. apetala* to belong to the *Ludia* of Commerçon. See *LUDIA*.

2. *L. Guidonia*. Swartz. Prodr. 83. (Guidonia; Browne Jam. 249. t. 29. f. 4.)—Petals none. Stalks terminal, single-flowered. Leaves oblong, pointed, serrated and downy.—Native of Jamaica. Swartz. Browne calls his plant Rod-wood, and says it "grows to a considerable size, being esteemed a fine timber, and much used in all sorts of buildings. The lines between the valves of the fruit are of a beautiful red, as well as the *placenta*." We know not why Swartz quotes him with a mark of doubt, nor have we ever seen any specimen of this species from either of these botanists.

3. *L. Thammia*. Swartz. Prodr. 83. Fl. Ind. Occ. v. 2. 950. (Thammia; Browne Jam. 245.)—Petals none. Stalks axillary, forked, many-flowered. Leaves elliptic-oblong, somewhat crenate, smooth and shining.—Native of Jamaica. Browne gathered it on the red hills above the *Angels*, but says it is not common. His own specimen is before us. This is a *shrub*, six feet high, with roundish, smooth, slightly zigzag branches, whose young ends are compressed and coloured. Leaves alternate, on round smooth stalks half an inch long, elliptic-oblong, with a blunt point, smooth and shining, slightly crenate, two or three inches in length, marked with pellucid dots readily seen when the leaf is held against the light. Flower-stalks from the young shoots, axillary, much shorter than the leaves, forked and as it were jointed, minutely downy, as are the calyx-leaves. The flowers are not numerous, larger than the common Myrtle, the two outer leaves of the calyx purplish, inner white, all reflexed. Stamens downy. Anthers yellow. Fruit with four, rarely five angles, and as many valves, which are revolute when ripe. Seeds numerous, with a purplish tunic. Swartz found this plant on the south coast of Jamaica, in bushy chalky spots, flowering in the spring. We have borrowed most of his description, comparing it with Browne's specimen.

4. *L. completa*. Linn. Sp. Pl. 733. Jacq. Amer. 167. t. 185. f. 60. Lamarck. Dict. v. 3. 374.—Petals five. Stalks many-flowered, axillary. Leaves ovate-oblong, finely serrated, rugose, smooth.—This was gathered in woods at Carthagena by Jacquin, from whose book alone we have any knowledge of it. The stem is shrubby, branched, nine feet high. Leaves about three inches long, of a broad ovate somewhat oblique figure, rugose, veiny, finely but sharply serrated, smooth, stalked. Common flower-stalks downy. Fruit yellowish red, often slightly triangular, ripening in August and September. The flowering season is June. The petals are as long as the calyx, but nothing is said of their colour, Jacquin having seen them in a faded state only.

Not one of this genus is known in the gardens of Europe, nor have any dried specimens, except the above-mentioned, fallen in our way.

LAEUANGER, in Geography, a town of Norway, in the diocese of Drontheim; 45 miles E.N.E. of Drontheim.

LEVIUS, in Biography, a Latin poet, who probably flourished about the time of Cicero. He wrote a poem entitled "Erotopagnia," or "Love games," which is quoted by Aulus Gellius, and Apuleius. He composed also a poem entitled "The Centaurs," which is quoted by Pectus under the title of Petrarum.

LA FERRE, in Geography. See *La FERRE*.

LAFITAU, JOSEPH FRANCIS, in Biography, born at Bourdeaux, entered the society of Jesus, and became a missionary among the uncultivated nations of North America. On his return home he wrote a work entitled "Les Mœurs des Sauvages Américains comparées aux Mœurs des premiers tems," in two volumes 4to.: "A History of the discoveries of the Portuguese in the New World," in two vols.

vols. 4to. which maintains a high reputation. He died about the year 1740.

**LAFITAU, PETER FRANCIS**, brother of the above, was a native of Bourdeaux, and became distinguished as a preacher among the Jesuits. Being sent to Rome on various negotiations he became a great favourite with pope Clement IX. who promoted him to the bishopric of Sisteron in Provence. He died in the year 1764, at the age of seventy-nine. He was author of the "History of the Constitution Unigenitus," two vols. 12mo.; "History of Clement IX.," in two volumes, and "Sermons," in four volumes, besides several devotional and practical treatises.

**LA FORCE**, in *Geography*. See *La Force*.

**LAFORDSWICK**, (Saxon, *blaford*, i. e. *dominus*, and *fwic*, *proditio*, *infidelitas erga deum*;) the betraying of a lord or master. This word is found in king Canute's laws. c. 61. and in the laws of king Henry I.

**LA FRESNAYE**, in *Geography*. See *La Fresnaye*.

**LAFVENSARI**, a small island in the gulf of Finland. N. lat. 59° 57'. E. long. 45° 32'.

**LAGA**, in *Antiquity*, denotes *lex* or *lax*: whence are deduced *Saxon-lage*, *Dane-lage*, &c.

**LAGA**, in *Geography*, a river of Sweden, which runs into the North sea; four miles W. of Laholm.

**LAGAMAN**, a town of Candahar; 60 miles N.E. of Cabul.

**LAGAN**, or **LAGON**, in our *Ancient Sea Laws*, shipwrecked goods, left by the sea, lying on the sand, either ashore, or out at sea.

The word seems formed from the Saxon *legan*, or *lugan*, *jacere*, to lie. Though others deduce it from the Latin *ligare*, to bind; and suppose it to denote goods tied together with a buoy, or the like, to hinder their sinking to the bottom, that they may be found again.

**Lagan** is usually joined with *jetson* and *stotson*; which see.

**LAGAN**, in *Geography*, a river of Ireland, which rises in the Sliebh-droob mountains, in the centre of the county of Down, and making a sweep to the west by Dromore, becomes the boundary between the counties of Down and Antrim, from the neighbourhood of Moira until it flows a little below Belfast into that large estuary called Belfast Lough. There are many villages, besides the considerable towns of Lisburne and Belfast, on this river, and its banks are adorned with numerous bleach greens. Great exertions have been used to improve the navigation of this river, and a canal joins it to Lough Neagh.

**LAGANUM**, in *Natural History*, the name of a genus of the echini marini, of the general class of the placentæ. The characters of the lagana are, that they have their mouth in the centre of the bale, and their aperture for the anus in its third region; that their superficies is whole, and their edges waved. Of this genus there are five known species.

**LAGARES**, in *Geography*, a town of Portugal, in the province of Beira; 14 miles S.S.W. of Viseu.

**LAGAU**, a town of Brandenburg, in the New Mark; 25 miles S.E. of Cultrin. E. lat. 52° 28'. E. long. 15° 26'.

**LAGEMAN**, (*Lagamannus homo habens legem*, or *homo legalis seu legitimus*: such as we call now good men of the jury. The word is frequently used in Domestday, and the laws of Edward the Confessor, cap. 38.

**LAGEN**, **LAGENA**, in ancient time, was a measure of wine, containing six sextarii: whence probably is derived our *flaggon*. The lieutenant of the Tower has the privilege to take *unam lagenam vini ante ma'um et retro*, of all wine ships that come up the Thames; and sir Peter Leicester, in his Antiquities of Cheshire, interprets *lagena vini*, a bottle of wine.

**LAGEN Bay**, in *Geography*, a bay on the W. coast of the island of Ila, S. of Lagen point.

**LAGENS**, a town of the island of Flores, one of the Azores, containing near 1400 inhabitants.

**LAGENULA**, in *Botany*, from *lagena*, a bottle, because the form of the fruit is like that of a little bottle or flaggon. Lourc. Cochinch. 88.—Class and order, *Tetrandra Monogynia*. Nat. Ord. *Cucurbitaceæ*, Linn. Juss.?

Gen. Ch. *Cal.* Perianth inferior, of four ovate-oblong, reflexed, permanent leaves. *Cor.* Petals none. Nectary fleshy, with four erect, somewhat approximated, lobes. *Stam.* Filaments four, awl shaped, equal to the calyx; anthers ovate, incumbent. *Pist.* Germen concealed by the nectary; style thick, shorter than the filaments; stigma simple. *Peris.* Berry small, bottle-shaped, with a narrow neck, of two cells, and containing two seeds. *Seeds* solitary, convex on one side, angular on the other.

Eff. Ch. *Cal.* Calyx of four leaves, inferior. Petals none. Nectary four-lobed. Berry of two cells. *Seeds* solitary.

1. *L. pedata*. Called by the Cochinchinese *Cây rât nhô lô*. A moderate-sized shrub, found on the hills of Cochinchina. The stem climbs by means of tendrils, and is branched, destitute of prickles. *Leaves* pedate, of five ovate, crenate, downy leaflets. *Flowers* whitish green, in terminal, spreading, subdivided clusters.

Such is Loureiro's description, which in most respects indicates a plant of the Gourd or Bryonia tribe, except the germen being superior. It should seem therefore to range with a few more genera, mentioned by Jussieu, at the end of his *Cucurbitaceæ*, which differ from the character of that order in the situation of their germen.

**LAGERSTREEMIA**, so called by Linnæus, in commemoration of his friend Magnus Lagerstræm, a director of the Swedish East India Company, member of the Royal Societies of Upsal and Stockholm, who communicated to him many natural productions, and some other curiosities, described in the fourth volume of the *Amenities Academicæ*, under the title of *Chinensis Lagerstræmiana*. Amongst these was an exquisitely carved horn of a Rhinoceros, now in the hands of the writer of this article, which represents a leaf of the *Cyamus Nelumbo*, accompanied by the flower and fruit in a smaller size, with other memorable plants, and several half-formed lizards, crawling as it were out of their native mud, and seizing on the grape, the Litchi, the Mango, and the Mangolian, celebrated oriental fruits. This seems to express the supposed beginning of animal life, with its dependence on the vegetable kingdom, and throws light on the mythological history of the *Cyamus*, to which article, written by our lamented friend the late Rev. Mr. Wood, in our 10th volume, we refer the reader.—Linn. Gen. 269. Schreb. 361. 833. Willd. Sp. Pl. v. 2. 1178. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 230. Juss. 331. Lamarck Dict. v. 3. 375. Illustr. t. 473. (Munchausia; Linn. Mant. 153. Schreb. 515. 833. Mart. Mill. Dict. v. 3. Juss. 331. Murr. Gott. Præf. t. 1. Adameba; Lamarck Dict. v. 1. 39.)—Class and order, *Isoandra Monogynia*. Nat. Ord. *Calycaethes*, Linn. *Sauricæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-shaped, angular, permanent, with six deep, sharpish, triangular teeth. *Cor.* Petals six, roundish or obovate, wavy; their claws thread-shaped, inserted into the calyx. *Stam.* Filaments numerous, thread-shaped, unequal, inserted into the calyx, and exceeding it in length; anthers roundish, incumbent. *Pist.* Germen superior, roundish; style thread-shaped, declining, longer than the filaments; stigma obtuse.

*Peric.* Capsule ovate, pointed, of six cells and six valves, rarely but four. *Seeds* numerous, angular, compressed, attached to the central hexagonal column.

*Eff. Ch.* Petals six, their claws inferted betwixt the teeth of the bell-shaped fix-cleft calyx. Stamens unequal. Capsule of four or six cells, with many angular seeds.

*Obf.* *L. parviflora* has but four, or occasionally only three, cells and valves to the capsule.

1. *L. indica.* Linn. Sp. Pl. 734. Curt. Mag. t. 405. J. Miller Ic.—(Tsjin-ki; Rumph. Amb. v. 7. 61. t. 28.)

—Petals pointed, crispd. Six flamens much longer than the rest. Panicle terminal. Leaves roundish-oval, smooth.

—Native of China, Cochinchina, and Japan. Kæmper says it is very rare. The *Hortus Keewensis* records its having been introduced into this country by the late duke of Northumberland, in 1759. Nothing could be a more desirable acquisition to the green-house or stove. In the latter it blooms most freely, and is increased readily by cuttings.

The *shrub* is about the size of a Pomgranate-tree, rather fraggling, smooth, with angular twigs. *Leaves* opposite or alternate, nearly sessile, an inch or two in length, of a broadish dotted elliptical form, slightly pointed, entire, finely rounded, smooth, except some short pubescence at the rib and veins on both sides. *Stipulas* none. *Buds* axillary, ovate, compressed. *Flowers* in a large, terminal, somewhat racemose panicle, of a fine rose-colour, not unlike a double stock at first sight, but far more delicate and without scent.

The *petals* are heart-shaped, pointed, excessively crumpled and curled, with long slender claws. *Anthers* yellow.

2. *L. Regina.* Roxb. Coromand. v. 1. 46. t. 65. (*L. Flus Regina*; Retz. Obf. faic. 5. 25. Adambæ glabra; Lamarck Dict. v. 1. 39. Adambæ; Rheed. Hort. Mal. v. 4. 45. t. 20, 21.)—Petals bluntnish, wavy. Stamens all nearly equal. Panicle terminal, much branched. Leaves oblong, pointed, smooth—Native of woody mountains in Malabar and Java, flowering during the hot season, and ripening seed in August. A moderate-sized tree, with spreading branches, angular and winged when young. *Leaves* from three to five inches in length, elliptic-oblong, entire, smooth, generally opposite, on very short stalks. *Panicle* compound, spreading. *Flowers* two inches broad, with rose-coloured, round, bluntnish, short-clawed petals, and very numerous, purplish, almost equal flamens, with yellow anthers. *Capsules* the size of a large oblong acorn, pointed, woody, smooth, accompanied by the reflexed calyx at their base, which is downy while in flower.

3. *L. hirsuta.* Willd. n. 3. (Adambæ hirsuta; Lamarck Dict. v. 1. 39. Katou-Adambæ; Rheed. Hort. Mal. v. 4. 47. t. 22.)—Petals pointed. Six flamens much longer than the rest. Panicle terminal, much branched. *Leaves* oblong, pointed, hairy.—Native of the provinces of Mala and Poiga in Malabar, according to Rheede, from whose work alone we have any knowledge of this species, and who represents it as the wild state of the preceding, differing in being taller, with downy or hairy leaves and branches. The *fruit* also is roughish with fine hairs. In his plate moreover the *petals* are less wavy and much more pointed, and he mentions that five flamens (we have ventured to preface six from analogy) are alone conspicuous in each flower. The flamens of *L. indica* enable us to understand this, and it is probable that the rest of the filaments are shorter than the calyx, so as to have passed unobserved. Lamarck, after having first, on Rheede's authority, defined and named this species, suggests in his Dictionary, v. 3. 376, that it may probably be only a variety of the last. We must leave this point in doubt, after having collected all the information in our power.

4. *L. Munchaufsa.* Lamarck Dict. v. 3. 375. Willd. n. 4. (*Munchaufsa speciosa*; Linn. Mant. 243. Murray Gott. t. 1.)—Petals bluntnish, wavy. Stamens all nearly equal. Cluster terminal, many-flowered, nearly simple. *Leaves* ovate, pointed, almost entire, smooth.—Native of China, according to Linnæus. His specimen is marked as coming from India. Lamarck, in his Dict. v. 3. 375, confounds this with *L. Regina*, from which it is nevertheless very distinct. The *leaves* are not half so long, much thinner, and are ovate, with much longer and slenderer foot-stalks. The only leaf we have seen agrees precisely with that drawn by Murray, except in being still less entire, the upper part being bluntly serrated. The *flowers* are copious, racemose rather than paniced, but they appear to differ very little in themselves from those of *L. Regina*, the petals in Murray's plate being erroneously made flat, obovate and obtuse. Willdenow probably took his specific character from thence, the plant being very rare, even in dried collections.

5. *L. parviflora.* Roxb. Coromand. v. 1. 47. t. 66. Willd. n. 5.—Petals wavy, blunt. Six flamens much longer than the rest. Flower-stalks axillary and terminal, about three-flowered. Leaves oblong, obtuse, downy beneath.—Native of the Circar mountains of India, flowering during the hot season, ripening seed in August and September. The inhabitants call it *Chinamghie*, and use the wood for various economical purposes. This is a little tree, differing from all the foregoing in the smallness of its flowers, which are less than the common Myrtle, white, chiefly axillary, usually three on each of the stalks, which grow in pairs, and are (like the leaves) about two inches long. The petals are six, round, with an undulated edge. The capsule has but three or four cells. Six of the flamens are as long as the corolla. Professor Willdenow, from misunderstanding the English description, describes the leaves as scabrous. They are smooth and shining above, downy at the back. S.

*LAGERSTROMIA*, in Gardening, contains a plant of the exotic tree kind, for the green-house, of which the species cultivated is *L. indica*.

*Method of Culture.*—This plant is capable of being increased, either by layers or cuttings of the young branches. The layers should be made from the young shoots of the preceding summer, and be laid down in the autumn. When they are well rooted in the succeeding autumn, they should be taken off and planted out in separate pots.

The slips or cuttings should be made from shoots of the same year's growth, and be planted out early in the summer, in pots of light earth, being plunged in a bark hot-bed, and covered with small bell hand-glasses, due shade and water being given. When well-rooted in the spring following, they may be taken up and planted in separate pots, filled with light mould, being afterwards managed as other green-house plants.

These plants afford variety in collections of potted plants of different kinds.

*LAGETTA*, in Botany, the Lagetto or Lace-bark of Jamaica. Juss. 77. Lamarck. Dict. v. 3. 376. Illustr. t. 289. (*Daphne Lagetto*; Swartz. Ind. Occ. v. 2. 680. Willd. Sp. Pl. v. 2. 419. Frutex foliis majoribus, cordatis, nitidis, petiolis semiopticaribus insidentibus; Browne Jam. 371. t. 31. f. 5. Laurifolia arbor, folio latiore, longo, mucroato, laevi, splendente; cortice inferiore in telas plurimas, linearum æmulas, extensili; Sloane Jam. v. 2. 22. t. 108. f. 1, 2, 3. t. 169. f. 1.) See *DAPHNE*.

This tree is a native of the loftier mountains of Jamaica and Hispaniola. Swartz says it is thirty feet high, with a trunk

stunk as thick as a man's thigh, the wood white and solid, the outer bark cracked and greyish; branches round and smooth. *Leaves* alternate, on short stalks, ovate or somewhat heart-shaped, more or less pointed, entire, from four to six inches long, evergreen, very smooth and shining, veiny, flat except a slight undulation at the edges; the under side pale. *Spikes* or *clusters* terminal, either simple or panicle, each scarcely a finger's length, of few flowers, which are white, four lines long, ovate, four-cleft, the mouth below the filaments closed with wool. *Stamens* eight, very short. *Germs* clothed with long upright hairs. *Drupe* involved with the permanent calyx, its pulp sweet and whitish, its coat rough with pungent bristles. *Seed* ovate, brittle.

We cannot find sufficient reasons to make this a distinct genus from *Daphne*, but having seen only a single leaf, without any parts of fructification, we presume not to decide with positiveness. The inner bark of this tree is very beautiful and remarkable, consisting of many layers, which are easily pulled out laterally, into a fine white silky reticulated web, like lace or gauze, three or four feet wide, which has been used in ladies' drels on many occasions; and Charles II. is said to have had a cravat made of it, presented to him by Sir Thomas Lynch, then governor of Jamaica. Swartz asserts that articles of drels made of this web, may be washed in soap and water without injury.

LAGGA, in *Geography*, a town of Sweden, in the province of Upland; 9 miles S.E. of Upfal.

LAGHI, a town of Arabia, in the province of Hadramaut, on the coast of the Arabian sea; 12 miles N.E. of Aden.

LAGNASCO, a town of the Ligurian republic; 11 miles N.W. of Genoa.

LAGNEUX, a town of France, in the department of the Ain, and chief place of a canton, in the district of Belley; 22 miles N.E. of Lyons. The place contains 2551, and the canton 10,266 inhabitants, on a territory of 207½ kilometres, in 14 communes.

LAGNY, THOMAS FANTET DE, in *Biography*, an eminent mathematician, was born at Lyons in the year 1660. He was intended for the bar, and was sent to pursue his studies for that purpose, first at the college of Lyons, and next at the university of Thoulouse; but having accidentally met with Fournier's Euclid, and a treatise on algebra, his genius for mathematics was developed, and he resolved to devote himself to the pursuit of his favourite science. He came to Paris in the year 1686, and was soon after appointed tutor to the duke de Noailles. He became a member of the Academy of Sciences, and was appointed by Louis XIV. royal hydrographer at Rochefort, but sixteen years afterwards he was recalled to Paris, and made librarian to the king with a considerable pension. He died in the year 1734, and in his last moments, when he no longer knew the persons who surrounded his bed, one of them, through a foolish curiosity, asked him "What is the square of 12?" to which he replied, as it were mechanically, 144. His works are, 1. *New Methods for the Extraction and Approximation of Roots*: 2. *Elements of Arithmetic and Algebra*: 3. *On the Cubature of the Sphere*: 4. *A general Analysis, or Method of resolving Problems*: and 5. *Several Papers in the Memoirs of the Academy*. Lagny excelled in arithmetic, algebra, and geometry, in which he made many important discoveries. He delivered the measures of angles in a new science, called "Goniometry;" in which he found the value of angles to great accuracy by means of compasses, without scales or tables of any kind. He paid great attention to "Cyclometry," or the method of measuring the circle, and calculated by means of infinite series the ratio of the circum-

ference of a circle to its diameter to 120 places of figures. Moreri.

LAGNY, in *Geography*, a town of France, in the department of the Seine and Marne, and chief place of a canton, in the district of Meaux, seated on the Marne, and containing three parish churches; 15 miles E.N.E. of Paris. N. lat. 48° 53'. E. long. 2° 46'. The place contains 1836, and the canton 12,257 inhabitants, on a territory of 157½ kilometres, in 31 communes.

LAGO, a town of Italy, in the department of the Lower Po; 4 miles N. of Comacchio.

LAGO Maggiore. See LANGENSSE.

LAGO Nero, a town of Naples, in Basilicata, at the foot of the Apennines, near a lake from which it receives its name; 12 miles N.E. of Policastro.

LAGOIA, a town of the island of May, one of the Cape Verde islands.—ALFO, a town of Portugal, in Algarva; 5 miles N.E. of Silves.—ALFO, a river of Africa, which runs into the Atlantic. N. lat. 6° 55'.—ALFO, a bay of the Indian sea, on the coast of Africa. S. lat. 33° 16'.

LAGOIA. See DELAGOIA.

LAGOIA d'Albafeira, a lake on the W. coast of Portugal, near the sea; 12 miles S.S.W. of Lisbon.

LAGOIA d'Obidos, a lake on the W. coast of Portugal, which discharges itself into the sea, four miles N.E. from Cape Carvaciro, in the province of Estramadura.

LAGOIA de Patos, a bay on the coast of Brazil. S. lat. 29° 25'.

LAGOIA de Pescara, a bay on the coast of Brazil. S. lat. 21° 30'.

LAGOAS, As, a town of Africa, in the country of Matamba, on the Sierra Leone. N. lat. 8° 40'. W. long. 10° 50'.

LAGOCHEILOS, (from *λαγως*, a hare, and *χειλος*, a lip), denotes, in *Surgery*, the deformity more commonly named a hare-lip. See HARE-LIP.

LAGODIA, in *Geography*, a town of Brazil; 85 miles W. of Fort Rio Negro.

LAGOECIA, in *Botany*, so named by Linnæus, from *λαγως*, a hare, and *ωνος*, a dwelling, or seat, the plant being, according to Bellonius, Obs. 32, (in Clus. Exot.) called in the isle of Lemnos *Lagochymen*, which means the form or seat of the hare.—Linn. *Gen.* 112. Schreb. 156. Willd. Sp. Pl. v. 1. 1184. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. ed. 2. v. 2. 53. Sm. Prodr. Fl. Græc. v. 1. 162. Juss. 227. Lamarck Illust. t. 142. Gært. t. 23. (Cuminoides; Tourt. t. 155).—Class and order, *Pentandria Monogynia*. Nat. Ord. *Umbellata*, Linn. *Umbellifera*, Juss.

Gen. Ch. *Cal. General involucre* of eight leaves, cut like a feather, fringed, reflexed, containing a small umbel; *partial* one of four leaves, in feather-like capillary segments, surrounding a solitary flower-stalk, shorter than itself. *Perianth* superior, of five leaves, in many capillary segments. *Cor.* Petals five, two-horned, shorter than the perianth. *Stam.* Filaments five, capillary, the length of the corolla; anthers roundish. *Pist.* Germen roundish, under the base of the perianth; style as long as the filaments; stigma two, one of them abrupt. *Peric.* none. *Seed* solitary, ovate-oblong, crowned with the perianth.

Obs. Gartner remarks that there are the rudiments of two seeds, though one only comes to perfection.

Ess. Ch. *Involucre* both general and partial, pinnatifid. *Perianth* of five leaves, in many capillary segments. *Petals* cloven. *Seed* solitary, inferior.

1. *L. Cuminoides*. Wild Cumin. Linn Sp. Pl. 294. (Cuminum sylvestre; Matth. Velgr. v. 2. 117. Camer. Epit.

519. *Κυμίστος αγρίος*; Diosc. lib. 3. cap. 69.)—This is the only known species of its singular genus, found in fields and vineyards, not uncommonly in Greece and the Levant. Its name in modern Greek is, according to Dr. Sillthorp, *Αγριοκίμων*, or Wild Marjoram; and Bellonius describes its scent and taste as like that of *Origanum heracleoticum*. Dioscorides speaks of the seed as a warm, rather acrid carminative, more powerful than the Garden Cumin. The root is annual, tapering. Stem ten or twelve inches high, branched, zigzag, round, striated, smooth, leafy. Leaves pale green, smooth, roundly, simply pinnate, with about a dozen pair of sessile, roundish, deeply cut, nearly opposite leaflets, and an odd one; the upper leaves become very much diminished, and bristle-pointed. Umbels terminal, globose, dense, half an inch wide, beset with shining, silvery, bristly points.—A figure of this is destined to appear in the *Flora Græca*, v. 3. p. 243.—We know not how the idea of a hare's form can bear any analogy to this plant, except it alludes to the seed, nestling amongst the fine bristly coverings of the flowers like a hare amongst grass.

LAGOECIA, in *Gardening*, contains a plant of the herbage kind, of which the species cultivated here is the wild or bastard cumin, *L. cuminoides*.

*Method of Culture*—These plants may be increased by sowing the seeds in autumn, on a warm border, soon after they are ripe, or where they are to remain; or when permitted to feather, they come up and form good plants. They afterwards require only to be kept clean from weeds, and in the former cases planted out when of sufficient growth where they are to grow.

Plants of this kind afford ornament and variety in the borders and other parts of shrubberies and pleasure grounds.

LAGOON ISLAND, in *Geography*, an island of the Pacific ocean, discovered in lieutenant Cook's voyage in 1769. It is of an oval form, with a lagoon in the middle, which occupies much the larger part of it: the border of land circumfering the lagoon is in many places very low and narrow, particularly on the S. side, where it chiefly consists of a beach or reef of rocks: it has also the same appearance in three places on the N. side: so that, the firm land being disjointed, the whole looks like many islands covered with wood. On the west end of the island is a clump of trees, appearing like a tower, and about the middle are two coconut trees, which rise above all the rest, which in approaching the island appear like a flag. The whole island is covered with trees of different verdure; but none could be distinguished except cocoa-nuts and palm-trees. The natives appeared to be tall, and to have remarkably large heads; they were of a copper colour, and had long black hair. Whilst they walked on the beach they seemed to be naked; but when they retired they covered themselves with something of a light colour. Their habitations were under some clumps of palm-nt trees, which appeared to Cook and his companions, who had long seen nothing but sea and sky, except the dreary hills of Terra del Fuego, to be a terrestrial paradise. S. lat. 18° 47'. W. long. 139° 28'. Variation 2° 54' E. Hawke'sworth's Voyages, vol. ii.

LAGOONS, *Middle*, a gulf on the coast of Yucatan, in the bay of Honduras. N. lat. 18° 7'. W. long. 83° 50'. *North Lagoon* is a gulf in the same bay. N. lat. 18° 40'. W. long. 83° 54'. *South Lagoon* in the same bay lies in N. lat. 17° 54'. W. long. 83° 50'.

LAGOPHTHALMIA, or LAGOPHTHALMUS, (derived from *λαγώς*, a hare, and *ὀφθαλμός*, an eye,) denotes, in *Surgery*, a particular case, where the patient experiences an inability of closing the eye-lids so as to cover the eye. It is the defect to which the term *oculus leporinus*, or *hare-eye*, has

sometimes been applied. The ectropium, or gaping of the eye-lids, if the affection is confined to the upper palpebra, now and then receives one of the foregoing appellations. Some writers, however, with much reason, are desirous of restricting the term *lagophthalmus*, or *lagophthalmus*, to cases of simple retraction of the eye-lid, unattended with any degree of eversion.

Various and many are the inconveniences which may be the consequence of this incapacity of properly covering the eye with the eye-lids. The tears are incessantly dropping over the cheek, because the alternate opening and closure of the eye-lids, so essential to the propulsion of this secretion into the puncta lachrymalia, are impeded. In a strong light the patient is quite blinded; for it is impossible for him to lessen the quantity of rays which fall upon the eye, by making the eye-lids approach each other. From this cause vision gradually becomes very much weakened. Nor can the patient sleep well in any apartments which admit the light. And, in addition to these unpleasant circumstances, we must mention the painful inflamed state of the eye, frequently induced by the irritation which it suffers from the lodgment of dust, and other extraneous substances upon it.

A preternatural swelling, or protrusion of the eye from the orbit, is sometimes the cause of lagophthalmus, which in this circumstance is to be regarded only as a symptom of another disease, and generally gets well with the primary affection. In the majority of cases the defect is situated in the upper eye-lid.

Several species of lagophthalmus are noticed by Richter. In some, though not many instances, the disease depends upon a weakness, or paralysis, of the orbicularis palpebrarum muscle. Here the upper eye-lid may readily be brought down over the eye with the fingers; but the patient is quite incapable of doing this without external aid. The cure can in general only be accomplished with difficulty. The treatment most likely to prove beneficial consists in applying corroborant and stimulating applications. Rubbing the skin of the eye-lids once or twice a day, with a drop or two of fennel-oil, electricity, frictions upon the eye-lids with the tinctura cantharidis, blisters near or immediately upon the eye-lids, the application of cold water to the eye by means of compresses wet very often in the course of the day; &c. are plans in repute. Letting the water of a shower-bath fall upon the hinder part of the head; cold applications assisted with the internal employment of bark, and camphorated remedies, are all likely means to do good in cases of the paralytic lagophthalmus.

A fissure in the lower, and especially in the upper eye-lid, whether an original malformation, or the consequence of a neglected wound, may produce a considerable exposure of the eye-ball, when the patient attempts to shut his eye; for at this period the margins of the slit will be drawn further asunder. This particular case requires a similar operation to that for the hare-lip. (See HARE-LIP.) But instead of the twisted suture, the surgeon is to employ the interrupted. See STURIE.

The most common kind of lagophthalmus is undoubtedly that which originates from a contraction of the integuments of the upper eye-lid, in consequence of wounds, abscesses, burns, &c. Here the observations, elsewhere made concerning the diagnosis and cure of an analogous case, are strictly applicable. See ECTROPIUM.

Sometimes lagophthalmus appears to depend upon an indurated thickening and contraction of the levator palpebræ superioris, and of the skin of the eye-lid together. In this case no surgical operation will avail in curing the disease, and every chance of benefit lies in a trial of other plans.

In order to preserve the sight, it is proper to guard the eye with a green shade from the effects of strong light, until the infirmity is completely removed.

**LAGOPODES**, in *Ornithology*, a name given to a division of the genus *Tetrao*, distinguished by a naked spot above the eyes, and hairy legs. See **TETRAO**.

**LAGOPUS**, in *Botany*, from  $\lambda\alpha\gamma\omega\varsigma$ , a hare, and  $\pi\upsilon\varsigma$ , a foot, a name which has been applied to several different plants, whose soft hairy heads of flowers have suggested the idea of a hare's foot. Among these are a species of *Plantago*; one of *Gnaphalium*, called by Linnaeus *disicum*; some grasses; and several of the *Diadelphica* class. There are grounds of suspicion that the *Lagocchia*, (see that article,) might primarily have been named with some allusion to the foot rather than the form of a hare, which its round hairy tufts of flowers might very well justify.

**LAGOPUS**, in *Ornithology*. See **GROUS**, **Red**, **PTARMIGAN**, and **TETRAO**.

**LAGOPUS**, in *Zoology*, is the name of a species of the canis, with a straight tail throughout of the same colour. It is sometimes called the white fox, the isatis, and the scy-coloured fox. It is found in Lapland and Siberia. See **FOX**.

**LAGOR**, in *Geography*, a town of France, in the department of the Lower Pyrenées, and chief place of a canton, in the district of Orthés; 8 miles S.E. of Orthés. The place contains 1700, and the canton 10,588 inhabitants, on a territory of 177½ kilometres, in 23 communes.

**LAGOS**, a sea-port of Portugal, in the province of Algarve, situated in a bay of the Atlantic, to which it gives name, defended by several forts; the harbour is deep, but full of rocks. This place is the residence of the viceroy of Algarve, and contains two parish churches, four convents, and about 4600 inhabitants; 96 miles S. of Lisbon. N. lat. 37°. W. long. 8° 39'.—Also, a river of Africa, which rises in Beniù, and runs into the Atlantic, N. lat. 5° 10'. Its navigation is obstructed by a bar at its mouth.—Also, a town of Mexico, in the province of Guadalajara; 36 miles N.E. of Guadalajara.

**LAGOSTOMA**, (from  $\lambda\alpha\gamma\omega\varsigma$ , a hare, and  $\sigma\tau\omicron\mu\alpha$ , the mouth,) is a term in *Surgery*, signifying the hare-lip.

**LAGOUSA**, in *Geography*, a small island in the gulf of Engia; 3 miles N. of Engia.

**LAGOW**, a town of Austrian Poland; 16 miles N. of Sandomirz.

**LA GRAVE**. See **La GRAVE**.

**LAGRIMOSO**. See **LACRIMOSO**.

**LAGUA**, in *Geography*, a town of the island of Cuba; 80 miles W.N.W. of Villa del Principe.

**LA GUAYRA**. See **GUAYRA**.

**LAGUEN**, one of the small Philippine islands, near the north coast of Samar. N. lat. 12° 43'. E. long. 125° 9'.

**LAGUERRE**, **LOUIS**, in *Biography*, a painter of histories on ceilings, staircases, halls, &c., and an assiduous imitator of Verrio; with whose name his own has been most inappropriately immortalized by Pope, in that characteristic verse,

“Where sprawl the faints of Verrio and Laguerre.”

Laguerre, though the son of a Catalan, was born in France; and his father being master of the menagerie at Versailles, he had the honour of having Louis XIV. for his god-father, and after him he was named. At first he was intended for the church, and was placed in the Jesuits' college for education; but having a hesitation in his speech, and therefore not suited to support their ambitious projects, and

having exhibited some taste in drawing, the god-father recommended to his parents to bring him up to the profession of painting.

He then studied in the school of Le Brun, and in the Royal Academy of Paris; and made so much progress, that, in the year 1683, at the age of 20, he came to England, and was immediately employed by Verrio upon the large work at St. Bartholomew's hospital; in which he succeeded so well, that he soon obtained considerable employment on his own account, and executed a great number of ceilings, halls, and staircases, in the houses of the principal nobility of the country, particularly at lord Exeter's at Burleigh, at Devonshire House, Piccadilly, Petworth, and Blenheim. King William gave him lodgings at Hampton Court, where he painted the “Labours of Hercules,” and repaired the large pictures called “The Triumphs of Cæsar,” by Andrea Mantegna.

His talents were not of a cast to demand very high respect, but they were fully equal to the mode in which they were employed,—which requiring a certain portion of ingenuity, is a certain walt of talents of a superior class. In a few years, it is probable his name will repose for perpetuity on the records of history, and the unlucky satire of Pope above mentioned.

His death happened in the year 1721, and in a place very seldom disturbed by such an event, viz. in the theatre of Drury-lane. He had gone there to see the Island Princes acted for the benefit of his son, who was newly entered upon the stage as a singer; but before the play began, he was seized by an apoplexy, and carried away senseless.

**LAGUNA**, in *Botany*. See **LAGUNÆA**.

**LAGUNA**, in *Geography*, a town of South America, in the province of Venezuela, on the west side of lake Maracaybo; 80 miles S. of Maracaybo.

**LAGUNA**, or *St. Christofal de la Laguna*, a city of Tenerife, so called from an adjoining lake, which does not now remain, about four miles from Santa Cruz. It used to be reckoned the capital of the island, the gentry and lawyers living there, and the courts of justice being held in this town; though the governor-general of the Canary islands resides at Santa Cruz, as being the centre of their trade both with Europe and America. The place, though pretty extensive, scarcely deserves to be dignified with the name of a city. The disposition of its streets is very irregular; but some of them are of a tolerable breadth, and have some good houses. In general, however, Laguna is inferior in appearance to Santa Cruz, though the latter is small compared with the former; and it is said to be in a declining state; vineyards being now planted where houses formerly stood; whereas Santa Cruz is daily increasing. Laguna is situated on an eminence, in a fertile plain of considerable extent. Beside vines, it bears wheat, Indian corn, potatoes, and a species of bean not unlike a lupin. From grounds still higher, water is conveyed to a variety of fountains in this city, as at Santa Cruz, in an aqueduct composed of wooden troughs, and supported by poles fixed into the earth. To the plain now mentioned succeeds a ridge of hills, of gentle ascent, from the summit of which may be easily traced the windings of a pleasant valley, stretching to the westward, along the feet of a range of hills that separate it from the sea-coast. The town of Ticonorta and numerous little villages form a scene agreeable and picturesque. The bosoms of the mountains are well cultivated, and their more rugged sides are chiefly covered with the spontaneous plants of warm regions, such as the *Cacalia kleinia*, the *Agave americana*, the *Cactus tuna*, besides others of little ornament or use. N. lat. 28° 28'. W. long. 16° 20'.

LAGUNA *Efcura*, a cape of Portugal, in the province of Beira; 7 miles S.W. of Guarda.

LAGUNÆA, in *Botany*, named by Cavanilles in memory of Andrew Laguna, a Spanish botanist and physician of the 16th century, who made a translation of Dioscorides, with a commentary, into his own language, and wrote also some botanical as well as medical works.—Schreb. 463. Willd. Sp. Pl. v. 3. 733. Mart. Mill. Dict. v. 3. (Laguna; Cavan. Diff. 173. Juss. 275. Lamarek Illustr. t. 577. Solandra; Murr. in Linn. Syst. Veg. ed. 14. 623. Juss. 273. Lamarek Illustr. t. 580. Cavan. Diff. 55. Triguera; Cavan. Diff. 41. t. 11.)—Class and order, *Monadelphina Polyandria*. Nat. Ord. *Columiferæ*, Linn. *Malvaceæ*, Juss.

Gen. Ch. *Cal.* Perianth simple, inferior, of one leaf, bell-shaped, slightly angular, but about half way down into five segments, permanent. *Cor.* Petals five, ovate-oblong, obtuse, spreading, attached to the base of the tube of the flaments. *Stam.* Filaments numerous, 25 to 30, united below into a tube, at the top of which, as well as at its sides, they become separate and distinct; anthers roundish. *Peric.* Germen ovate-oblong, superior; style thread-shaped, longer than the flaments, either with five spreading branches at the top, or only five notches; stigmas capitate. *Peric.* Capsule ovate-oblong, obscurely five-sided, with five cells and five valves; the partitions contrary to the valves. *Seeds* several, roundish, with three angles.

Obs. The *Solandra* of Murray has a deeply five-cleft calyx, and five distinct stigmas; *Laguna* of Cavanilles has a five-toothed calyx, bursting at one side, and a stigma with five notches or teeth. Schreber has very judiciously united the two, from observing similar differences among many species of the genus *Hibiscus*.

Ess. Ch. Calyx simple, five-cleft. Stigmas five-cleft. Capsule of five cells, with contrary partitions.

1. *L. lobata*. Lobed Lagunæa. Willd. n. 1. (*Solandra lobata*; Murr. in Comm. Goett. for 1784. 21. t. 1. Cavan. Diff. 279. t. 136. f. 1. Hibiscus Solandra; L'Herit. Stirp. v. 1. 103. t. 49. Ait. Hort. Kew. ed. 1. v. 2. 455.)—Leaves heart-shaped, three-lobed, unequally serrated.—Native of the Isle of Bourbon. *Root* fibrous, annual. *Stem* branched, two feet high, round, clothed, like every other part of the herbage, with prominent hairs. *Leaves* alternate, on long stalks, heart-shaped, more or less deeply three-lobed, acute, unequally cut or serrated, two or three inches long, and nearly as wide, of a light green. *Stipulas* linear-oblong. *Flowers* on long stalks, in long terminal clusters, with bractæas like the stipulas. *Corolla* white, about half an inch or more in diameter. It is a plant of little beauty, compared at least with the generality of its natural order.

2. *L. ternata*. Ternate Entire Lagunæa. Willd. n. 2. (*Solandra ternata*; Cavan. Diff. 279. t. 136. f. 2.)—Leaves ternate and simple, entire.—Native of Senegal, whence Adanson brought specimens, the only ones of which we have any account. The *root* appears to be annual. *Stems* several, about a foot high, slender, round, downy, like the other parts. *Leaves* alternate, distant, on long stalks, mostly ternate, the upper ones simple; leaflets oblong, narrow and entire, the side ones smallest. *Stipulas* small, acute. *Flowers* on longish, simple, solitary, axillary or lateral stalks, shorter than the leaves. Of the *corolla* we have no information.

3. *L. aculeata*. Prickly Lagunæa. Cavan. Diff. 173. t. 71. f. 1.—Leaves ternate, cut. *Stem* prickly.—Found near Pondicherry. The *stem* is a foot and half high, muri-

cated. *Leaflets* nearly equal, obtuse, cut. *Flowers* yellow. Sometimes the leaflets are more than three.

*L. Paterfonis*, Sims in Curt. Mag. t. 769. (*L. squamea*; Venten. Malmais. t. 42. Hibiscus Paterfonius; Andr. Repof. t. 286.) found in Norfolk island by Col. Paterfon, a very handsome shrub with a large purple flower, appears to us at best but a doubtful *Lagunæa*, nor is the account of the fruit given with sufficient accuracy in Andrews, for us to judge respecting this matter.

LAGUNILLA, in *Geography*, a town of South America, in the vice-royalty of New Granada; 14 miles S.W. of Merida.—Also, a town of South America, in the province of Cordova; 30 miles E. of Cordova.

LAGUNILLAS, LAS, a town of Peru, in the diocese of La Paz; 30 miles N. of Potosi.

LAGURUS, in *Botany*, from *λαγωρος*, a hare, and *ουρα*, the tail, alluding to the appearance of the spike or head of flowers. Hare's tail Grass.—Linn. Gen. 37. Schreb. 52. Willd. Sp. Pl. v. 1. 453. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 173. Sm. Prodr. Fl. Græc. v. 1. 68. Fl. Brit. 143. Juss. 30. Lamarek Illustr. t. 41. Gærtn. t. 1. Class and order, *Triandria Digynia*. Nat. Ord. *Gramina*, Linn. Juss.

Gen. Ch. *Cal.* Glume single-flowered, of two long, linear, very thin, spreading, feathery valves. *Cor.* of two firmer valves; the outermost longest, terminating in two small straight awns, with a third awn from the middle of the back, twisted and more or less bent backward; inner valve smaller, narrower, pointed, beardless. Nectary of two lanceolate blunt scales, tumid at their base. *Stam.* Filaments three, capillary; anthers oblong, pendulous, cloven at each end. *Pist.* Germen superior, oblong; styles two, short; stigmas long, cylindrical, feathery. *Peric.* none, except the permanent corolla attached to the seed. *Seed* solitary, obovate, clothed with the corolla and its awns.

Ess. Ch. Calyx of two valves, single-flowered, feathery. Outer valve of the corolla with two terminal awns, and a dorsal twisted one.

1. *L. ovalus*. Linn. Sp. Pl. 119. Sm. Engl. Bot. t. 1334. Fl. Græc. Sibth. v. 1. 71. t. 90. Schreb. Gram. t. 19. f. 3.—Native of sandy open places in the south of Europe and north of Africa, flowering early in summer. Being found in Guernsey, it is admitted into the list of British plants. The *root* is annual, composed of downy fibres, like all grasses that grow in driving sand. *Stem* solitary, various in height, downy and soft like the leaves, whose sheaths are long and rather tumid. *Spikes* ovate, at first erect, but soon bent to one side, or drooping, from the power of the wind; it is not unaptly compared to the tail of a hare, which it resembles in density, shape, lightness, and whiteness. The name in modern Greek, *λαγυρίτζα*, expresses the same idea.

*Lagurus cylindricus* of Linnæus being properly removed to *Saccharum*, the above stands a solitary species of its genus. We know not of its having any useful property, except serving to decorate flower-pots in winter, mixed with any everlasting flowers.

LAGUNUS, in *Zoology*. See *Mus*.

LAGUYO, in *Geography*, a town of Africa, on the Gold Coast, in the country of Fantin.

LAHAAR, a town of Hindoostan, in the circar of Gohud; 40 miles E. of Gwalior. N. lat. 26° 9'. E. long. 79 31.

LAHADSI, a town of Arabia, in the province of Yemen; 16 miles N.W. of Aden.

**LAHALL**, a town of Sweden, in the province of West Gothland; 10 miles N. of Gothenburg.

**LAHAWANNOCK CREEK**, a river of Pennsylvania, which runs into the Susquehanna, S. lat. 41° 20'. W. long. 57° 58'.

**LAHAGIAN**, or **LANGIGEN**, a town of Persia, in the province of Ghilan, on the Isperrud, situated on an eminence; eight miles E. of Reshd.

**LAHISZIN**, a town of Poland, in the palatinate of Brzele; 12 miles N. E. of Pinfk.

**LAHMEDIE**, a town of Egypt; 14 miles S.S.W. of Damietta.

**LAHN**, a town of Silesia, in the principality of Jauer, on the Bober. N. lat. 50° 58'. E. long. 15° 44'.—Also, a river of Germany, called Lohm, which rises in the N.E. part of the principality of Siegen, about 10 miles E.N.E. from the town of Siegen, and runs into the Rhine near Lohrstein.

**LAHNSTEIN**, or **LOHNSTEIN**, a town of Germany, at the conflux of the Lohm and Rhine; four miles E. of Coblenz.

**LAHO**, a town of Africa, on the Ivory Coast, which has been represented as a large and populous place, extending a league along the coast; the shore being composed of a beautiful yellow sand, against which the sea beats with great violence. The natives, who are well supplied with all kinds of provisions, are of a mild, tractable, and gentle disposition; but ready to seize any opportunity for raising the price of their ivory, according to the demand, and the number of ships they observe on the coast. They are visited by interlopers of all nations, the free ships of England, Holland, Denmark, and formerly the Hanse towns, whence the occasions of raising their price frequently occur. Laho is planted, like Axim, with a great number of cocoa-trees; and thus the neighbouring countries of both districts very much resemble one another. Cape Laho is situated in N. lat. 5° 10', equally distant from Cape Palmas and Cape Tres Puntas, and the western frontier of that district, called the country of the "Good People." Beyond Cape Laho the coast falls in directly N.E., forming a fine bay, at the head of which opens the mouth of the little river, called Jaque Lahu, or Das Balbas, running directly N. and S. but not navigable. Farther eastward is Korbi Laho, the little pool, called the "Bottomless pit," so called both by the English and Dutch, because several unsuccessful attempts had been made to found it; but at last it was found to be no more than 60 fathoms; the difficulty of sounding it resulting from a tide at the bottom which carried away the lead faster than they could furnish line. Excepting this pool, there is no anchorage for several leagues along the coast. The produce of the adjacent country consists of cloths and stuffs of Quaquas, ivory, and provisions. The negroes of this part are singularly skilful in swimming and diving; for if any pieces of coral, iron, glass, &c. are thrown over board, the negroes will dive after them with such rapidity as to catch them before they reach the bottom.

**LAHOLM**, or **LAGEHOLM**, a sea-port town of Sweden, in the province of Halland, at the mouth of the Laga, near the sea, with a good salmon fishery, fortified by the Danes, and ceded to Sweden by the peace of Brønnebro; 12 miles S.S.E. of Halmstad. N. lat. 56° 40'. E. long. 12° 45'.

**LAHOOR**, a town of Thibet, on the Setlege; 24 miles N.W. of Gangotri. N. lat. 23° 10'. E. long. 76° 25'.

**LAHORE**, or **PANJAB**, a subah or province in the N.W. part of Hindoostan, bounded on the N. by Cashmere, on the E. by the mountains of Thibet, on the S.E. by

Delhi, on the S. by Moultan, and on the W. by the Indus, which separates it from Cabul and Candahar; about 300 miles in length from E. to W. and about 100 miles from N. to S. This country, which is now occupied by the Seiks, is extensive, and very fertile; affording, in addition to all the necessaries of life, wine, sugar, and cotton-wool: the last of which supplies the manufactories of the province. It is watered by the Indus on the W., and the Setlege on the E., and also by the Behut, Chunaub, Rauvee, &c. In the tract between the Indus and Jhylum (Behut) there are salt-mines, which are wonderfully productive, and which afford fragments of rock salt, hard enough to be formed into vessels, &c. Gold (according to the Ayin Acbaree) was found in the channels of its rivers; and the same is related of those of Kemaon, which proceed from the same ridge of mountains. See **PANJAB**.

**LAHORE**, a city of Hindoostan, and capital of the country above described, situated on the Rauvee. This city was the residence of the first Mahometan conquerors of Hindoostan, before they established themselves in the central parts of the country. It owes its modern improvements, however, to Humaion, the father of Achar, who made it his residence during a part of his troublesome reign. Thevenot says, that, including the suburbs, it was three leagues in length at that period, and when he saw it, about the year 1665, the city itself was above a league in extent. Schauguive, son of Achar, allowed the Portuguese to build a church there; and some of its furniture remained at the time of Thevenot's visit. It has 12 gates. It is now the capital of the Seiks; but by the desertion of its inhabitants, it has lost not only a considerable part of its population, but much of its ancient splendour. Here are manufactures of carpets, cotton, &c. Ice is brought from the northern mountains to Lahore, and sold there all the year. The famous avenue of shady trees, so much spoken of by the early Indian travellers, began at Lahore, and extended to Agra, near 500 English miles. N. lat. 31° 50'. E. long. 73° 50'. See **SEIKS**.

**LAHOREY**, a town of Hindoostan, in Baglana; 20 miles S. of Bahbelgong.

**LAHORPORUM**, a town of Hindoostan, in Oude; 25 miles W.N.W. of Kairabad.

**LAHR**, a town of Germany, in the bishopric of Munster; 12 miles N.W. of Munster.

**LAHR**, or *Lohr*, a town of the principality of Nassau Saarbruck Ufingen, the capital of a lordship, on the river Schutter; 18 miles S.S.E. of Straiburgh. N. lat. 43° 21'. E. long. 7° 55'.

**LAJA, LA**, a town of Peru, in the diocese of La Paz; 14 miles N.W. of La Paz.

**LAJAPOUR**, a town of Hindoostan, in Guzerat; 10 miles S. of Surat.

**LAIBEEDY**, a town of Africa, in the country of Tunis; 18 miles S.E. of El Jemna.

**LAICA**, a town of Abyssinia; 100 miles S. of Miné.

*LAICA vi remota.* See **VI**.

**LAID-UP** is applied to a ship, when she is either moored in a harbour during the winter season, or laid by for want of employment; or when she is become incapable of farther service.

*Laid under metal.* See **METAL**.

**LAIDA**, in *Geography*, a town of Bengal; 14 miles S. of Curuckdeagh.

**LAIDLIA**, a town of Hindoostan, in Golconda; 24 miles N. of Warangole.

**LAIGLE**, a town of France, in the department of the Orne, and chief place of a canton, in the district of Montagne.

Mortagne. The place contains 5947, and the canton 14,386 inhabitants, on a territory of 207½ kilometres, in 19 communes.

LAIGNES, a town of France, in the department of the Côte d'Or, and chief place of a canton, in the district of Châtillon; 19 miles W.S.W. of Châtillon-sur-Seine. The place contains 1559, and the canton 11,103 inhabitants, on a territory of 497½ kilometres, in 23 communes.

LAILAKARI, a small island on the E. side of the gulf of Bothnia. N. lat. 65° 14'. E. long. 25° 9'.

LAINIZ, JAMES, in *Biography*, a Spanish Jesuit, and the first general of the order after the death of the founder, (see LOYOLA), was born in the year 1512. He studied theology at Paris, became the intimate friend of Loyola, and was one of seven who bound themselves by a vow at Mont-Marte to erect the new community; he is said to have had a great share in drawing up the constitutions for their government. Upon the death of the general, he succeeded as superior of the society, but was not formally elected till the year 1558. He assisted at the council of Trent, where he supported the papal authority to a very extravagant degree. He obtained from pope Paul IV. the perpetual generalship of the order, together with the following extraordinary privileges, *viz.* the right of making all manner of contracts, without the privity or consent of the society; that of giving authority and authenticity to all comments and explanations of the constitutions; the power of making new, and altering the old ones, and also to establish prisons, for the confinement of refractory and disobedient members, independently of the secular power. In 1561, he went to France in the suit of cardinal de Ferrara, the legate of pope Pius IV., and attended the conference at Poissy, where he disputed with Beza and Peter Martyr. After his return to Rome, he refused a cardinal's hat, which was offered him by the pope. He died in 1565, leaving behind him some theological and moral treatises. Moreri.

LAINO, in *Geography*, a town of Naples, in Calabria Citra; 10 miles W.N.W. of Cassano.

LAJOUN, a town of Persia, in the province of Mazanderan, near the coast of the Caspian sea; 12 miles E. of Reshd.

LAIR, in *Agriculture*, a term applied to land in a state of grass or fward. See LAY and LAYER.

LAIR, *Lays*, or *Layer*, among *Sportsmen*, denotes a place where deer harbour by day.

LAIR, or *Layr* of a deer, is the impression which the beast has made on the grass and ground where he has lain down, or reposed.

LAIR, among *Husbandmen*, also denotes a place where cattle usually rest, under some shelter; the ground being enriched by their dung.

LAIRE, FRANCIS XAVIER, in *Biography*, who was born at Vadans, in France, in 1739, and died at Sens in the year 1800, was celebrated for his knowledge of bibliography, and published, 1. *Memoirs towards the History of great Men of the 15th and 16th Centuries*, with a Supplement to *Mataire's Annals of Typography*. 2. *Specimen Historicum Typographicæ Romanæ cum Indice Librorum*. 3. *Epitola ad Abbate Ugolini*. 4. *On the Origin and Progress of Printing in Franche Compté*, and other pieces.

LAIRESSE, GERARD, a painter of history and portraits, born at Liège in 1640. His father first instructed him in the art, and he is supposed also to have been a disciple of Bertholet, whose manner he very much followed in his practice.

For a long time the art of painting was an unprofitable pursuit to him; but as he made his pictures gay and agree-

able, he at last, by the help of Vytenburgh, a picture merchant at Amsterdam, acquired considerable credit.

His style of painting was a compound of those of Poussin and the old French school. While he aimed at imitating the best Italian masters, he never avoided those false airs of the head and limbs, which seem rather taken from the stage than from nature; so that his works do not rise to the level of true merit.

He was blind for some years before his death; but having reflected upon the principles of the art, and being a communicative man, he was constantly attended by artists and amateurs, who were gratified by his instructions. Those treatises on design which go under his name were not written by him, but collected from his observations, and published after his death, by a society of artists. He died in 1711, at the age of 71.

LAIS, the famous courtesan, born at Hyccara, a small city in Sicily; and being carried into Greece by Nicias the Athenian general, began her conquests by music. We mention it not among the encomiums of the art; but almost all the celebrated courtesans of antiquity were originally musicians. According to Athenæus, (lib. xiii.) music was thought a necessary female accomplishment in the time of Darius; for Parmenio wrote Alexander word, that he had taken at Damascus three hundred and twenty-nine of the Persian monarch's concubines prisoners, who were all well skilled in music, and performed on the flute, and other instruments. Laïs was supposed to be the daughter of the courtesan Timandra and Alcibiades. She began first to exercise her powers of enchantment at Corinth, in Greece. She is often called the Corinthian, from having passed great part of her life in that voluptuous city. She set so high a price on her favours, that Demosthenes, of whom she required for one night ten thousand drachmas, refusing to comply with her demands, said, "he would not buy repentance at so high a price." As a caprice, she was more indulgent to the disgusting Cynic Diogenes. Aristippus, another philosopher, but much more amiable, almost ruined himself in sacrifices to this terrestrial divinity, who loved him less than Diogenes. When he was rallied on her coldness, he said, "I cannot flatter myself that either wine or fish is in love with me, yet I enjoy, and feed on them both with great pleasure." This female sometimes ridiculed the frailty of the philosophers whom she had captivated. "I do not understand what is meant by the austerity of philosophers; but with this fine name, they are as much in my power, as the rest of the Athenians." After having corrupted all the youth of Corinth and Athens, she went into Theffaly, to see a young man with whom she was in love, when, it is said, that some women, jealous of her beauty, assassinated her in the temple of Venus, about 340 years B.C. Greece erected statues to her memory.

LAISBY, in *Geography*, a town of Swedish Lapland, in the lap-mark of Umea; 100 miles N.W. of Umea.

LAISCHEV, a town of Russia, in the government of Kazan, at the union of the Kama and Volga; 20 miles S. of Kazan. N. lat. 55° 20'. E. long. 49° 14'.

LAISSAC, a town of France, in the department of Aveyron, and chief place of a canton, in the district of Milhau. The place contains 1083, and the canton 7453 inhabitants, on a territory of 172½ kilometres, in 12 communes.

LAIT-CHEOU, a city of China, of the first rank, in the province of Chantong, is built on a promontory, and has a convenient harbour, a numerous garrison, and several armed vessels to defend the coast. The jurisdiction extends over seven cities, two being of the first class. N. lat. 37° 9'. E. long. 119° 46'.

PLAITY comprehends such of the people as are not included under the denomination of clergy; and may be divided into three distinct states, *viz.* the civil, the military, and the maritime. For the origin of this distinction, see CLERGY.

LAK, in *Geography*, a town of Hungary; 18 miles E.S.E. of Canifcha.

LAKE, in *Physical Geography*, a body of water, mostly of considerable extent, situate, unconnected with the ocean, in an inland place, and commonly in the immediate neighbourhood of lofty mountains. The form of these collections of waters is various; but those that receive and emit rivers, are generally of an elongated shape, and their longest diameter is in the direction of the rivers that traverse them. Lakes are generally divided into four classes: 1. Such as neither receive nor emit rivers. 2. Such as emit rivers, without visibly receiving any. 3. Such as receive one or more rivers, without emitting any. And, 4. Such as both receive and send forth rivers.

1. *Lakes which neither receive nor emit rivers*, are not frequently seen of any considerable extent; but there are countries where they occur in great number, and as it were in groups. This is the case in the deserts northward of the Caspian sea, and in the plains between the Ural mountains and the Irtysh, and in the vast desert of Baraba, between the Irtysh and the Obb. The soil of these countries is described by the accurate Mr. Patrin as being uniformly composed of a marl, varying only in the proportion of the admixed clay and sand. The numerous lakes found in that tract of country are for the most part only depressions or basins filled by the rains and melted snow: their greatest extent is scarcely ever above three leagues in circumference, and generally they are much smaller. Their depth, too, is usually very inconsiderable, for it seldom exceeds a fathom, and is frequently not beyond a few feet. Most of them are only temporary; for towards the end of the summer they are generally found dry.

A remarkable circumstance, as observed by the same naturalist, is that in the same plain, at the distance of a few hundred paces, some of these lakes are fresh-water lakes, while the water of others is abounding either with sea salt, or with sulphat of magnesia (Epsom salt); or they are impregnated with both those salts, either uniformly mixed, or each of them in a separate part of the lake; in some cases the sea-salt and the Epsom salt are formed at the same period; in others the latter of these salts manifests itself only towards the end of the summer.

The cause of the saltness observable in some lakes has been by most authors on this subject ascribed to salt springs at their bottom; and probably they are in the right with regard to most of them; but in the above instance, several circumstances unfavourable to that hypothesis exist in the nature of the soil, and the mode and determinate quantity in which those salts are deposited at the bottom; whence Patrin conceives that the lakes in question, as well as most other salt lakes of the same kind, owe their saltness to principles or particles, with which they are furnished immediately from the atmosphere, in the same manner as nitre is formed in particular situations in warm climates, ceasing to be generated as soon as the soil has taken up the quantity of saline matter suitable to its nature. The general rule laid down by Buffon, that lakes which emit rivers are fresh-water lakes, and that such as do not send forth any are salt lakes, appears to be inconsistent with experience; since, on one hand, the great lake Titicaca, in Peru, supposed to be eighty miles in circumference, and giving out no river, is by Lact, Acofta, Garcialfo della Vega, and others, described as a fresh-water

lake; while the largest of all salt lakes, the Black sea, discharges its redundant waters, with a rapid course, through the Bosphorus into the Mediterranean.

Dr. Halley is of opinion, that all great perennial lakes are saline, either in a greater or less degree; and that this saltness increases with time; and on this foundation, he proposes a method for determining the age of the world.

To the lakes of this first class likewise belong those lodged in the craters of extinct volcanoes, or at least in depressions considered by most geologists as the remains of volcanic energy. One of the most remarkable, on account of its elevation, is that which travellers relate to exist on the summit of the Adam's peak in Ceylon. This mountain is seen at a distance of forty leagues; which appears to indicate its height to be at least that of Mount *Ætna*. Its cone, which is difficultly accessible, has 200 paces in diameter at its summit, and in the middle of the platform is situated a lake of considerable depth. Ribeiro's Hill, of Ceylon.

Dolomieu, in a letter to Fanjas Saint-Fond, inserted in this naturalist's work, "Sur les Volcans éteints du Vivarais," describes a lake filling up the crater of an extinct volcano in the Serra de Eltrella; a ridge of mountains in the north of Portugal, denominated *Mons Herminius* by the ancients.

All the lakes of *Agnano* and *Averne*, near Naples, are supposed by many authors to have been craters of volcanoes. The former of these lakes, we are told by Lalande (*Voyage*, t. 6. p. 27.) appears sometimes to boil at its borders, especially when its waters are high. This ebullition, like that of the *Acqua Zofa* near Rome, is occasioned by gaseous fluids traversing the water. On the borders of this lake are the vapour-baths of San-Germano.

2. *Lakes which emit rivers without receiving any.*—These are more numerous than the preceding. The more copious the subterraneous waters by which they are supplied, the more considerable are the rivers sent forth by them. The *Seliger lake*, in the government of Twer, 60 leagues N.E. from Moscow, gives origin to the largest river in Europe, the Volga; although no river is visibly received by that lake. The same may be said of the lake called *Koko-nor*, at the foot of the eastern ridge of the Tibetan Alps, from which issue two of the largest rivers of Asia, the Hoanho, or Yellow river, and Kiam, or Blue river, which, after having traversed part of the Chinese empire, empty themselves into the Japanese sea.

Of the same kind are the two small lakes in New Castile, in Spain, called *los ojos de la Guadiana*, situated near the Alcazar mountains, and considered as the sources of the Guadiana.

The *lake of Mont-Cenis*, though it does not emit a considerable river, is yet remarkable on account of its great elevation, which is 6000 feet perpendicular above the level of the sea. This lake (together with the Cenis, which issues from it) is supplied by waters conveyed to it by subterraneous channels, and which descend from the neighbouring mountains, which are as elevated above the lake as this latter is above the plains of Piedmont. This lake is three quarters of a league long, and from 1800 to 2400 feet broad. Saussure is of opinion that it has formerly been situated at a greater elevation; since, at a height of more than thirty feet above its present level, traces of erosion produced by the Cenis are still remaining, as well as calcareous layers, exactly like those still deposited by the waters of that river.

There are in the Pyrenees lakes which appear to have exactly the same origin as the lake of Mont Cenis, and which equally emit rivers; and several of these lakes occur

even at a greater elevation, (about 700 feet above the level of the sea,) such as the lakes of *Liens, las Gougous,* and *Onet,* in the mountains above Bargey. They are frozen over for the greatest part of the summer, and are only partially deprived of their icy covering in the interval between the months of June and August. The lake of Mont Ceuis, on the other hand, had, at the end of September, when Saussure observed it, a very mild temperature. It is so well stocked with fish, especially trouts, that, in the year 1780, it produced a yearly rent of 636 livres.

3. *Lakes which receive one or more rivers, without emitting any.*—Most of these formerly both received and sent forth a river; but the one emitted has become dry, on account of the diminution of the influent river; or the cavity that contains it may have enlarged to such a degree, that the river it receives is barely sufficient to repair, by new supplies, the loss which the lake sustains by evaporation. To this class belong, among others, the *Caspian sea,* as it is improperly called, which receives the waters of the Volga, of the Ural, and of some other rivers. This vast lake, which formerly occupied a much more considerable space than at the present day, and not only included the *lake of Aral,* but probably had even a communication with the Euxine sea, (see CASPIAN,) still continues to decrease, in proportion as the capacity of the rivers which supply it is found gradually to diminish. Another lake of this kind is the *Dead sea,* or lake Asphaltites, in Palestine. See ASPHALTITES.

Such was the lake that formerly covered *Cashmere,* which see. Lakes of this kind will be naturally formed in every case, where the waters of a river are inclosed, in any part of their course, by elevated lands. The first consequence of this stoppage is, of course, the conversion of the inclosed lands into a lake; and if this happens near the fountains of the river, and the ground is solid, it is likely to remain a lake for ever; the river not having force enough in its infant state to work itself a passage through the mountains. Hence it is that more lakes are found near the sources of rivers than in the lower parts of their course. If the river be inclosed after it has gained a great accession of water, and, of course, strength; it will, indeed, at first, form a lake, as before; but in time, the place at which it runs over, will be gradually fretted away, as in the case of the Behut. The Euphrates, in like manner, opens itself a passage through mount Taurus; and the Ganges through mount Imaus; and even though the base of the mountain be of the firmest texture, it will give way to the incessant friction, through a course of ages; for either of these passages may have been an operation of many thousand years. In the case of the Ganges, which passes through mount Imaus, it may be supposed that the lower strata were softer than the upper; for the upper still remain to a great height. In that of the Behut, the latter appears to have exited long enough to deposit a vast depth of soil, before it dispersed. Rennell's Memoir.

In the interior of Africa a vast lake is said to exist, which is supposed to receive the Niger. In America we have the lake Titicaca in Pern, into which runs a river, the source of which is near Casco.

4. *Lakes which both receive and send forth rivers,* are the most numerous of all. They are generally found in vallies, or in plains, in the proximity of great chains of mountains. The most remarkable among those of the Alps are—

The *lake of Geneva,* traversed by the Rhone. Its elevation above the level of the sea, according to De Luc, is 126 feet, according to Shuckburgh 1152, and according to the observations of professor Pictet 1134 feet. The Rhone enters it in the neighbourhood of Villeneuve: at its leaving it, near Geneva, it divides into two branches, which encom-

pass an island, and soon again unite. This lake formerly extended as far as Bex; and the village Port-Valley, which is at present at the distance of more than an English mile, was situate close to its banks. The lake of Geneva is subject to an annual swelling, by which its waters are raised from five to six feet above the ordinary water-mark. But besides this periodical rising of its waters, a fluctuation is sometimes observed, not unlike that produced by the flux and reflux of the sea. This motion, which generally continues for some hours, is in those parts called *Seiches.* It is most striking in the neighbourhood of Geneva. The cause of this phenomenon is not well understood. Fatio attributed it to gusts of wind, by which the water of the smaller lake is protruded beyond the sand-bank that separates it from the larger; and on falling back produces a fluctuation. Jallabert, observing that the *Seiches* take place without any gusts of winds, looked for the cause of this phenomenon in the sudden dissolution of snow by which the river Arve, becoming suddenly turgid, retards the course of the Rhone which issues from the lake. Saussure, on the other hand, has witnessed the sudden swelling of the Arve, without any accompanying *Seiches* in the lake. Bertrand is of opinion that electrical clouds attract and raise the waters of the lake, which, on falling back, produce that undulation; and Saussure and Vaucher add, that sudden local variations in the pressure of the atmosphere, may contribute to the production of this phenomenon. Patrin is inclined to attribute such sudden fluctuations of lakes to the development of subterranean gases, which also, by mixing with the atmosphere, produce that violent agitation, which, according to him, cannot be the effect of a simple disturbance of the equilibrium, but must be looked for in a chemical fermentation taking place in the atmosphere. An oscillation similar to the *Seiches* of the lake of Geneva, though in a less degree, has been observed also in some other lakes of Switzerland. To the same cause Patrin ascribes the hollow sound which some lakes are known to emit, and which is not unlike the noise that precedes the eruption of volcanoes. Some writers inform us that several lakes of Switzerland, and among them the lake of Geneva, give out a grumbling noise of this kind. Pallas has seen, in the Saïan mountains, near the source of the Yenisei, a lake called *Boudamy-Koul,* which, according to the account given of it by the Tartars of its neighbourhood, emits, at the approach of winter, sounds compared by them to howling. Also the inhabitants of the borders of the lake Baikal have informed Patrin, that they have often heard a dreadful howling proceed from that lake.

The *lake of Lucern,* in the Swiss canton of that name, (also called the Vierwaldtâder sea,) is situated 1320 feet above the level of the sea, according to Pfyster; 1314, according to De Luc; 1350, according to Trembley; and 1392 feet, according to Wyfs. The river, Reufs enters it at Fluelin, and is again emitted near Lucern. This most romantic of all lakes is surrounded by rocks consisting partly of limestone, partly of the calcareous breccia, called Nagelfluhe, and by sand-stone mountains. The line of demarcation between these two formations of rocks runs in a direction from E. to W.; to the S. of this line nothing is seen but lime-stone, and nothing but calcareous breccia and sand-stone in a northern direction. See more of this lake in Ebel "über die Schweiz, &c." 1805.

The *lakes of Brienz and of Thun,* in the canton of Berne, are both traversed by the river Aar, which enters the former of these lakes at its N.E. extremity, and leaves it at its southern end; when, at the distance of about two miles, its waters unite with those of the lake of Thun. The rocks of both sides of the lake of Brienz consist of lime and clay-stone.

Dr. Ebel tells us, that on the N. side formerly large masses of the most beautiful varieties of red and white fluor spar were found, which, from the pure fluxure of lime, passed into blackish-grey granular carbonate of lime. The lake of Thun is situated about 1780 feet above the level of the sea, and a few fathoms higher than the lake of Brienz. Its northern banks are entirely mountainous; half of the southern bank is flat and level. The rocks on the north side consist chiefly of the remarkable breccia and sand-stone formation, of which Mount Rigi, in the canton of Schweiz, is composed. The breccia is made up of rolled pieces of all dimensions, from 50 cubical feet, down to the size of large grains of sand; the whole cemented by a coarse grained calcareous grit possessing great tenacity, so that on the application of blows, the included stones, instead of becoming detached from their cells, are generally seen cloven asunder. These rolled pieces consist of various kinds of granite, gneiss, porphyry, flint, and flint-slate, horn-stone, granular and compact lime-stone, and a variety of red, clayey, ferruginous boulders, which, on further decomposing and dissolving, stain the cement in which they are imbedded with a red colour. The mountains on the S. and E. sides consist of lime-stone. The temperature of the lake of Thun, in the beginning of the month of July, at a depth of 350 feet, was found by Saussure to be 4° Reaumur, while, at the surface, the same thermometer indicated 15°. The water of the lake of Brienz, at the same time of the year, at the depth of 500 feet, shewed the temperature of 3 $\frac{1}{2}$ °, while that of the surface was 16°, and that of the atmosphere 15°.

*The Lake of Zurich.*—The principal river which enters this lake, is the Linth or Limmat, which, after having received the Mag, sent forth by the lake of Wallenstadt, falls into the lake of Zurich, near a mountain called the Bush-berg. The elevation of this lake above the level of the sea is 1270 feet. During the hot weather of the summer months its waters are seen to rise higher, and to overflow its banks, owing to the influence of the heat on the vast glaciers, and masses of snow of the Alpine chain of mountains. Several geognostic facts render it highly probable that formerly the Rhine, in its course to Germany, traversed both the lake of Wallenstadt and that of Zurich.

*The lake of Constance, or the Boden See,* is traversed by the Rhine, which enters it at the S.W. extremity, and is again given out near Constance. Its elevation above the level of the sea is 1089 feet. It is navigable for vessels of 3000 cwt. Within a period of eight centuries, it has only twelve times been covered with ice. This beautiful expanse of water formerly extended as far as the Rheinthal, or the valley of the Rhine: a change effected by the slow but uninterrupted deposition of alluvial land at the mouth of that river.

*The Langen-See, or Lago Maggiore* of the Italians, the *Lacus Verbanus* of the Romans, a lake on the borders of Switzerland, Piedmont, and the Milanese territory, receives and sends forth the river Tessin. Its length from Tenero to Sesio, is 44 Italian miles; its greatest breadth, between Luino and Ferriole, is above seven Italian miles; its elevation above the level of the sea 762 feet, according to Pini, but only 636 according to Saussure; its depth, at the chapel of la Bardia, opposite Locarno, is 335 feet. Many considerable rivers empty themselves into this lake, such as the Tessin, the Verasca, the Maggia, the Tofcina, and the Tresa; in short it receives all the waters of the immense group of mountains that encompasses it.

The natural character of the Lago Maggiore is a sublime wildness, blended with the milder beauties of the Italian soil; a narrow compass gradually widening into a vast ex-

panse. Towards the north and westward it is surrounded by elevated granitic mountains; while the east and north sides exhibit a series of smaller hills, which gradually lose themselves in the plain of Lombardy. From Magadino to Luina, on the N.E., the dark and rugged mountains of Gamborogno rise 6000 feet above the surface of the lake; and the wooded Pino, with the mountain of Canobbio, which appear to close the lake, form a long basin, abounding with fish, and known by the name of *Lago di Locarno*.

On the Piedmontese side of the Lago Maggiore, at Baveno and its neighbourhood, are the quarries of granite, which have furnished the magnificent columns that decorate the churches and palaces of Milan. In these parts are likewise found the beautiful crystals of felspar, that were first discovered by Pini. At the mouth of the river Toccia are the quarries of red and white granite, and behind Mergozzo those of the beautiful variety of marble, of which the cathedral of Milan is constructed. At Grantola are seen the vestiges of an extinguished volcano, which is, however, not considered as such by the learned Abbate Pini, who visited it in 1790.

*The Lake of Como,* about 24 miles from Milan, receives, among other smaller rivers, the Adda, which is again sent forth at its eastern extremity. The elevation of this romantic lake, the favourite spot of the younger Pliny, is, according to Oriani, 654 feet above the sea.

*The Garda,* a lake of Italy, between the Veronese and Bressan, is traversed by the Mincio.

A remarkable lake belonging to this class, on the French side of the Alps, is the *Lac de Joux*, in the Jura mountains. It is traversed by the river Orbe, which on issuing from this lake, is engulfed in vault funnels, hollowed out by its own waters in the calcareous strata, which at present are seen in a vertical position, owing to the effects of the rupture they experienced at the time when the revolution took place, which produced the lake; and this same river, after a hidden course of three quarters of a league, re-appears in a valley, 680 feet below the funnel-shaped cavities that conveyed it to its subterranean channel; from whence it proceeds towards and traverses the lakes of Neufchatel and Bienné.

Sweden, and other mountainous parts of Europe, likewise abound with lakes traversed by rivers. Of this kind is the lake of Bala, in North Wales. See *BALA-pool*.

Northern Asia has two very considerable lakes of this description, viz. the *lake Norzajins*, in Chinese Tartary, at the southern base of the Altaic chain, where it is traversed by the Irtsch and the Baikal, in East Siberia. This latter is traversed by the river Angara. (See *BAIKAL*.) M. Patrin, who has twice visited this remarkable lake, has described the highly destroying effects which its waters, in their gradual formation of the basin, have produced in the stratified mountains that bound its western shores. But it is not the Baikal alone which has thus formed its own bed, for the same cause has prevailed at the formation of those vast Canadian lakes, the lake Superior, Huron, Erie, and Ontario, connected together by the river St. Laurence, which takes its course through their stupendous basins.

We are indebted to Saussure for some very interesting observations respecting the *temperature* of the waters of the principal Alpine lakes. It appears from the experiments of this celebrated naturalist, made with a thermometer of his own invention, that even in the hottest summer months, the cold which prevails at the bottom of those lakes far exceeds that observable in the depth of the sea. The following are among the results he obtained.

In the *lake of Geneva*, on the 6th of August, at a depth of 312 feet, the thermometer (having Reaumur's scale) indicated

rated a temperature of  $8\frac{1}{2}^{\circ}$ ; that of the surface was  $15^{\circ}$ , and that of the atmosphere  $20^{\circ}$ . On the 11th of February, in a depth of 950 feet, (namely, near the rock of Meillerie, being the deepest part of the lake,) the temperature was  $4\frac{1}{2}^{\circ}$ ; that of the surface  $4\frac{1}{2}^{\circ}$ ; that of the atmosphere  $13^{\circ}$ . It is to be observed that as the elevation of this lake (according to Deluc) is 1126 feet above the level of the Mediterranean, the bottom of its basin is situated only 176 feet above the same level.

The waters of the *lake of Anney*, situated 210 feet above the lake of Geneva, had, on the 14th of May, and at a depth of 163 feet, the temperature of  $4\frac{1}{2}^{\circ}$ , while that of the surface was  $11\frac{1}{2}^{\circ}$ , and that of the air  $10^{\circ}$ .

In the *lac du Bourget* in Savoy, the thermometer, on the 6th Oct., at the depth of 240 feet, indicated  $4\frac{1}{2}^{\circ}$ ; at the surface  $14\frac{1}{2}^{\circ}$ ; in the air  $10\frac{1}{2}^{\circ}$ . Saussure observes, that the cold of the water of this lake cannot be ascribed to any foreign cause, since it receives no stream from the Alps, and its communication with the Rhone furnishes it with water only during the turgidity of that river in summer.

In the *lake of Thun*, in the canton of Berne, elevated about 630 feet above that of Geneva, the temperature, on the 7th of July, at the depth of 350 feet, was observed to be  $4^{\circ}$ ; the temperature of the surface was  $15^{\circ}$ , and that of the atmosphere  $16^{\circ}$ . At the same time the temperature of the lake of Brienz, which is contiguous to the lake of Thun, was  $3\frac{3}{4}^{\circ}$  at the depth of 500 feet.

The waters of the *lake of Lucern*, situated 191 feet above the lake of Geneva, had, on the 28th of July, and in a depth of 600 feet, the temperature of  $3\frac{9}{10}^{\circ}$ ; temperature of the surface  $16\frac{1}{10}^{\circ}$ ; of the air  $18\frac{6}{10}^{\circ}$ .

*Lake of Constance*.—The temperature on the 25th of July, at the depth of 370 feet, was  $3\frac{4}{10}^{\circ}$ ; on the surface of the water  $14^{\circ}$ ; in the air  $16^{\circ}$ .

*Lago Maggiore*.—On the 19th of July, at the depth of 335 feet, the temperature was  $5\frac{4}{10}^{\circ}$ ; at the surface  $20^{\circ}$ ; in the air  $18^{\circ}$ . It is remarkable that though the temperature at the bottom of this lake is so low, yet olive and orange trees are seen to thrive on its borders in the open air.

The comparative experiments which Saussure made on the temperature of the sea, gave the following results. On the 8th of October, the same thermometer, immersed at Porto Fino, on the coast of Genoa, to the depth of 886 feet, indicated  $10\frac{6}{10}^{\circ}$ , while the temperature at the surface was  $16\frac{7}{10}^{\circ}$ , and that of the atmosphere  $15\frac{3}{10}^{\circ}$ . At Nice, on the 17th of October, and at the depth of 1800 feet, the temperature proved to be  $10\frac{6}{10}^{\circ}$ , while that of the surface of the water was  $16\frac{4}{10}^{\circ}$ . From this difference between the temperature in the depth of the sea, and that of the bottom of lakes, it has been inferred that it is not the bulk of the mass of water which proves an obstacle to the free communication of the external caloric, and that the low temperature observed in the lakes of the Alps is owing to a particular and local cause.

Besides the general cause which produces a gradual *diminution* in the extent and depth of all lakes, there are others, which, operating on particular lakes, effect a more or less sudden change in that respect, according to the circumstances under which they take place. All rivers emptying themselves into lakes, convey thither more or less of the substance of the mountains from which they descend, and of the soil of the tracts of country which is traversed by them. The nearer, therefore, a lake is to those high mountains from which streams, in their descent, may carry away the *detritus* of rocks, the more speedily its basin will be filled up; while, on the other hand, a lake situated at a greater distance, in the middle of a plain, and receiving only sand

and mud, part of which is carried off again by its outlet, will experience a much less rapid diminution. Some naturalists have thought it possible to determine the relative antiquity of lakes, by the extent of the alluvial land deposited in their basins by those rivers which enter them; but, according to Patin, it is a matter of great difficulty to obtain satisfactory *data* on this head, and no general rules can possibly be laid down without a previous and careful examination of all the circumstances attending the locality of each particular lake. Thus; for instance, (says the same author,) we see that the lake of Neufchatel, at the foot of the Jura mountains, has already experienced a very considerable diminution through the mechanically forming effects of the waters of the Orbe, while those produced by the Rhone are scarcely perceptible in the lake of Geneva, although this lake is probably of greater antiquity than the other. The lake of Anney, which is wedged in between mountains, is already in a great measure choked up with their *detritus*. The valley of Chamouni, according to Saussure's observations, was also formerly a lake; but situated at the foot of the highest mountains of Europe its basin has long since been levelled by the alluvial land carried into it from all sides by the Aveiron and other streams. The lac du Bourget, on the other hand, which occupies the middle of a vast basin, where it receives its calm waters unfringed with foreign matter, is less than many others subject to the influence of this particular cause of the diminution of lakes.

The large lakes, with which the northern regions abound, serve for very good purposes, inasmuch as the warm vapours arising from them serve for a defensive against the pinching cold of those climates. To this it is owing, that Ireland, Scotland, &c. are less affected with frosts than much warmer countries.

They also furnish exhalations and vapours, which distil on the countries bordering upon them in refreshing showers, and prevent their being barren deserts.

The lake Nefs, in Scotland, has been commemorated by many writers, but never with any degree of judgment, till Mr. Frazer gave a perfect account of it to the Royal Society. It never freezes though the winters be ever so severe, and is full of springs in almost every part; and its waters, in the time of the severest frosts run fluid, and smoking for six miles down the river into which they are discharged, while every thing is frozen about them. The river runs very slowly notwithstanding, and from this smoke of the water there is raised a sort of fog which overspreads the whole country for several miles. There is a mountain near its side, of two miles perpendicular height from the surface of the lake; and on the summit of this mountain there is another lake, which has no spring visibly running into it, nor any outlet, and yet always keeps of the same degree of fulness, summer and winter. Due west from the river into which the lower lake discharges itself, there is an opening of sea, or frith, of two miles long and six miles wide; the middle of this is sometimes dry, and it is then easily seen that this was once dry land, and an inhabited country. There are found there large bodies of trees felled, and lying straight along; the wood of these is black, but it is very found, and there are many tumuli, or heaps of stones, to be seen under water in different parts of the frith, one of which is accessible at low water, and there have been found in it urns, which prove that they have been all burying-places. Phil. Trans. N. 255. p. 231.

As the sea washes away the banks of this frith, there is found in many places a large quantity of wrought timber; beams of fourteen, or more feet long, with the marks of the axe, and other instruments upon them; and at the depth

of sixteen feet, in the steep banks of the neighbouring river Bouly, there are found oak-trees and pieces of burnt timber. We find by this, that the face of the whole country about this lake is very different from what it was some ages ago; and there seems some resemblance between the present face of things here, and that in the bogs of many parts of England. The trees found buried in these were felled by the conquering Romans, and perhaps these are of some such origin.

We have many singularities offering themselves to our view in the lakes of our own country; that of their freezing at peculiar seasons is not one of the least. Philosophical Transf. N<sup>o</sup> 114.

*Lake Bituminous.* The existence of an expanse of mineral pitch, sufficiently extensive to merit the appellation of a lake, is a circumstance so very remarkable, that it will not be deemed improper to set apart an article for the description of the bituminous lake of the island of Trinidad. A description of this celebrated pitch lake was first given by Mr. Anderson, in the Philosophical Transactions for 1780, and some notices relative to it were communicated by Mr. Tobin, in the eighth volume of the Linnaean Transactions; but we now possess a more complete account of it by Dr. Nugent, who visited it in October, 1807, and whose memoir is published in the first volume of the Transactions of the Geological Society.

The pitch lake of Trinidad, by the French called La Braye, is situated on the north side of the gulf of Paria, on the high point La Braye, a considerable head-land, principally composed, at its southern side, of a kind of porcelain jasper. It is not easy to state precisely the extent of the collection of pitch; the lines between it and the neighbouring soil not being always well defined; and indeed Dr. Nugent supposes it to form the substratum of the surrounding tract of land. It may, however, be said, that it is bounded on the north and west sides by the sea, on the south by the just mentioned rocky eminence of porcelain jasper, and on the east by the usual argillaceous soil of the country; the main body may, perhaps, be estimated at three miles in circumference; the depth cannot be ascertained, and no subjacent rock or soil can be discovered. That part of this expanse, which may properly be called a *lake*, is situated higher than the adjoining land, and you descend by a gentle slope to the sea, where the pitch is much contaminated by the sand of the beach.

On approaching the lake a strong sulphureous and pitchy smell is perceived; and on a nearer approach, the bituminous plain itself opens to the view, appearing at first sight to be an expanse of still water, frequently interrupted by clumps of dwarf trees, or islets of rushes and shrubs. Dr. Nugent (from whose memoir this article is abstracted) was so struck by the singularity of the scene, that it was some time before he could recover from his surprize so as to investigate it minutely. The surface of the lake is of the colour of ashes; and at the season when this traveller visited the lake, not sufficiently smooth to be slippery; it was not adhesive, though it received the impression of the foot, and the confluence was such as to bear the travellers without any tremulous motion whatever; but in the dry season the surface is probably in a state approaching fluidity, as is shewn by pieces of wood and other substances being enveloped in it: different bodies have been known slowly to sink into it. If a quantity be cut out, the cavity left will be shortly filled up. Numberless proofs are given of its being at times in this softened state; the negro houses of the vicinage, for instance, built by driving posts in the earth, frequently are twisted or sunk on one side. In many places it seems to have actually overflowed like lava, and presents

the wrinkled appearance which a sluggish substance would exhibit in motion.

This bituminous plain is intersected by numerous interstices or chafms, filled with water in the wet season; they are generally deep in proportion to their width, some being only a few inches in depth, others several feet, and many almost unfathomable. The people of the neighbourhood derive their supply of water from this source, and refresh themselves by bathing in it; the water is perfectly uncontaminated by the pitch, and fish are caught in it. The arrangement of the chafms is singular; the sides are invariably shelving from the surface, so as nearly to meet at the bottom; but they bulge out towards each other with a considerable convexity. These crevices will now and then close up entirely; when marks or seams are left behind.

The bituminous substance forming this lake presents different appearances in different spots; in some parts it is black, with a splintery or a conchoidal fracture, of considerable specific gravity, and with little or no lustre, resembling particular kinds of coal, and so hard as to require a severe blow of the hammer to break it; in other parts it is so much softer as to be easily cut with a knife or spade, when the interior appears vesicular and oily. In one place it bubbles up in a perfectly fluid state, and in one of the neighbouring plantations it is said to occur of a bright colour, shining, transparent, and brittle, like bottle glass or resin. The odour in all these instances is strong, and like that of a combination of pitch and sulphur, which latter substance, however, is nowhere to be perceived. A bit of the pitch held in the candle melts like sealing-wax, and burns with a light flame, which is extinguished whenever it is removed, and in cooling the bitumen hardens again. It may be converted to many useful purposes, and is, indeed, universally used in the country wherever pitch is required. The reports of naval officers who have tried it are favourable to its more general adoption; in which case this vast collection of bitumen would afford an inexhaustible supply of an essential article of naval stores, and being situated on the margin of the sea, would be wrought and shipped with little inconvenience or expence.

Immediately to the southward of this bituminous lake, the face of the country, as seen from La Braye, is a good deal broken and rugged, which Mr. Anderson attributes to some convulsion of nature from subterranean fires, in which idea he is confirmed by having found in the neighbouring woods several hot springs. He is of opinion, that this tract has experienced the effects of the volcanic power, which, as he supposes, elevated the great mountains on the main and northern side of the island. As the production of bituminous substances has been attributed to the action of fire on beds of coal, Dr. Nugent was particular in his inquiries with regard to the existence of such beds, but could not learn that there was any certain trace of coal in the island.

Dr. Nugent, in attempting to explain the origin of this bituminous lake, inclines to the side of the Huttonian geologists, grounding his opinion on the general character of the country, and several local appearances, such as the amazing quantity of alluvial soil and bituminous substances brought down by the river Orinoko, and deposited on the shores of the gulf of Paria, and the west side of Trinidad; as also the traces of subterranean fire, such as hot springs, vortices, frequent earthquakes, and two singular volcanic mounds at Point Icaque.

“A vast river like the Orinoko,” he says, “must for ages have rolled down great quantities of woody and vegetable bodies, which, from certain causes, as the influence

of currents and eddies, may have been arrested and accumulated in particular places; they may there have undergone those transformations and chemical changes which various vegetable substances similarly situated have been proved to suffer in other parts of the world. An accidental fire, such as is known frequently to occur in the bowels of the earth, may then have operated in separating and driving off the newly-formed bitumen, more or less combined with siliceous and argillaceous earths, which forcing its way through the surface and afterwards becoming insipidated by exposure to the air, may have occasioned such scenes as I have ventured to describe. The only other country accurately resembling Trinidad, of which I recollect to have read, is that which borders on the gulf of Tama, in Crim Tartary. From the representations of travellers, Springs of naphtha and petroleum equally abound, and they describe volcanic mounds precisely similar to those of Point laque. Pallas's explanation of their origin seems very satisfactory, and I think it not improbable that the river Don and sea of Azof may have acted the same part in producing these appearances in the one case, as the Orinoko and gulf of Paria appear to have done in the other. It may be supposed that the destruction of a forest, or perhaps even a great savanna on the spot, would be a more obvious mode of accounting for this singular phenomenon; but all this part of the island is of a recent alluvial formation, and the land all along this coast is daily receiving a considerable accession from the surrounding water. The pitch-lake, with the circumjacent tract, being now on the margin of the sea, must, in like manner, have had an origin of no very distant date; besides, according to the representation of captain Mallet, which has been frequently corroborated, a fluid bitumen oozes up and rises to the surface of the water on both sides of the island, not where the sea has encroached and overwhelmed the ready-formed land, but where it is obviously in a very rapid manner depositing and forming a new soil."

The observations of captain Mallet, above-mentioned, but the accuracy of which Dr. Nugent had no opportunity of ascertaining personally, are, that "near Cape la Brea (La Braye) a little to the S.W. is a gulf or vortex, which in stormy weather gushes out, raising the water five or six feet, and covers the surface for a considerable space with petroleum, or tar."—"On the E. coast," he adds, "in the bay of Magaro, there is another gulf or vortex similar to the former, which, in the months of March and June, produces a detonation like thunder, having some flame with a thick black smoke, which vanishes away immediately; and in about twenty-four hours afterwards, is found along the shore of the bay a quantity of bitumen or pitch, about three or four inches thick, which is employed with success." The same author likewise quotes Gumball as stating, in his Description of the Orinoko, that "about seventy years ago, a spot of land on the western coast of this island, near half way between the capital and an Indian village, sunk suddenly, and was immediately replaced by a small lake of pitch, to the great terror of the inhabitants." Mallet's Topographical Sketch of the Island of Trinidad.

LAKE of the *two Mountains*, a piece of water, that lies westerly from Montreal, being properly the mouth of Ottawa river; 20 miles long, and 5 broad. It is surrounded by cultivated fields of the Iroquois and Algonquin Indians, whose village stands on a delightful point of land, that projects into the lake. Each tribe has a Roman Catholic missionary. They attend public worship in the same church. Their pastors have taught them to read and write. Their warriors are about 500.

LAKE of the *Woods*. See WOODS.

LAKE *River*, a river of America, which runs into the Mississippi, N. lat. 46° 33'. W. long. 95°.

LAKE *River, Little*, a river which runs into the Mississippi, N. lat. 45° 36'. W. long. 94° 23'.

LAKEs, *Subterranean*. That there are in many places immense subterranean lakes, can scarce be doubted, because we see them in some places; but their effects are often perceived where they are not seen, and puzzle the people who attempt to account for those effects upon other principles. The famous Zirchnitzer lake in Carniola, which fills and empties itself, at times, in an impetuous manner, bringing up with its waters fish, and even wild fowl, communicates with another immense subterranean lake in the mountain Savornick; and according to its filling or emptying, the upper one is also filled and emptied. See DUCK.

The grotto Podspetselio, in the same country, gives another instance of such a subterranean lake. The people of the neighbouring country enter the side of the mountain where this lake is, by a small opening, through which they go to a cavern of a great width and height; and at the end of this is a small opening again, through which they go on to the edge of a vast subterranean piece of water. They go with torches, and find the water very clear and fine. It is ten cubits deep at the edge, and doubtless is much more in the middle. The water runs into this lake by a large channel, and runs out of it again by another, falling down a precipice into another lake, and that with such a noise, that the report of a pistol cannot be heard near it. Stones thrown in every way are heard to fall into water, and there is great reason to suppose the lake a German mile long; for at this distance there is another water discovered through such another cleft of the rock, which stands at the same horizontal height as this, and is subject to the same accidents at the same time. This vast body of water sometimes all runs off in a few minutes, and leaves the basin dry, and after some weeks it fills again with a frightful noise. As these accidents always happen to both the waters above mentioned, at the same time, they appear very plainly to be only the two sides of the same lake. Phil. Trans. N° 191.

We have in England many of these reservoirs, the water of which is always remarkably clear and cold, and is so loaded with spar, that it generally incrusts things very quickly that are put into it; and when raised into vapours, as a part of it sometimes is, by the subterranean heat, or carried up with other vapours, stops at the ceiling of the vaults, and there forms stalactite, and other such concretions. In many of these lakes also are found the round balls of spar, called *stalagmite*. They are composed of several crusts gathering round some central nucleus, and often exceed the size of a school-boy's marble. Phil. Trans. N° 144.

In Pen-Park hole, in Gloucestershire, there is a remarkable instance of this, that strange cavern containing one of the largest of the lakes in our kingdom.

It was accidentally discovered by some miners: it is twenty-nine fathoms deep from the surface, being a vast cavern of the shape of a horse-shoe, surrounded with rugged rocks and rough walls of earth, containing in the midst of it a river or subterranean lake, twenty fathom broad and eight fathom deep, of the same cold and petrifying water with the other reservoirs of this kind.

LAKE, or LAQUE, a preparation of different substances into a kind of magistry for the use of painters, dyers, &c. One of the finest and first invented of which was that of *gum lacca* or *laque*; from which all the rest, as made by the same process, are called by the common name *laques*. See LAC or LACCA.

We may observe more generally, that all vegetable colours, which are soluble in water, are found to have a certain degree of affinity for some earths and metallic oxyds. These combinations are called lakes. Thus, if a solution of alum is added to an infusion of madder, a mutual decomposition takes place, and part of the alumine falls down intimately united with the colouring matter of the madder: the separation is much assisted by the alkali. They are chiefly of two colours only, red and yellow: the red owing their colour to madder, Brazil wood, or cochineal; and the yellow to the different yellow infusions used in dyeing. Both are generally used for water colours, and in oil painting as transparent colours. These pigments are almost invariably composed either of alum, or sometimes the solution of tin, and some other watery solution of a colouring matter.

Of the red lakes, that made with cochineal is the most beautiful, and of the greatest value. It is called *carmine*, from its being applied to imitate the colour of the flesh. For the method of preparing it, see COCHINEAL. See also CARMINE.

On the receipt for making carmine, introduced under the article COCHINEAL, a correspondent has made the following observation.

The carbonat of soda and alum, added in the first instance, would be mutually decomposed, and the alumine, with the colouring matter, would be precipitated with the dregs, which are afterwards separated from the clear liquor; so that when the white of egg came to be added, the earth of the alum and a portion of the colouring matter, said to be carried down by the albumen, cannot be present. Should the process here given have any analogy to that which is practised, it would appear that the solution of cochineal in water has the white of egg added to it, in the first instance, if it is at all necessary, for the purpose of clearing the coloured solution, a property for which that substance is remarkable. That after the liquid becomes clear, and is separated from the dregs, the carbonat of soda and alum are added, when a precipitate, consisting of the alumine united with the finer parts of the colouring matter, may be expected. The remaining colouring matter, which is of less beauty, is then used for the red lake.

Instead of using cochineal for making carmine, a much clearer colour may be extracted from the refuse of scarlet cloth. The bits of cloth are boiled in a solution of potash, which extracts the colour, and holds it in solution. If to this a certain portion of alum be added, the colouring matter will be precipitated with the alumine, of a greater or less intensity, proportionate to the quantity of this earthy basis. In Doffie's *Handmaid to the Arts*, we are told that the best of the lakes commonly sold is made from the colour extracted from scarlet rags, and deposited on the cuttle-bone; and that it may be prepared in the following manner: dissolve a pound of the best pearl ashes in two quarts of water, and filter the liquor through paper; add to this solution two more quarts of water, and a pound of clean scarlet shreds, and boil them in a pewter boiler, till the shreds have lost their scarlet colour; take out the shreds and press them, and put the coloured water yielded by them to the other; in the same solution boil another pound of the shreds, proceeding in the same manner; and likewise a third and fourth pound. Whilst this is doing, dissolve a pound and a half of cuttle-fish bone in a pound of strong aqua-fortis, in a glass receiver, adding more of the bone, if it appears to produce any ebullition in the aqua-fortis; and pour this strained solution gradually into the other; but if any ebullition be occasioned, more of the cuttle-fish bone must be dissolved as before, and added, till no ebullition appears in the mixture. The crimson sediment deposited by the liquor thus prepared

is the lake: pour off the water, and stir the lake in two gallons of hard spring water, and mix the sediment in two gallons of fresh water; let this method be repeated four or five times. If no hard water can be procured, or the lake appears too purple, half an ounce of alum should be added to each quantity of water before it be used. Having thus sufficiently freed the lake from the salts, drain off the water through a filter, covered with a worn linen cloth. When it has been drained to a proper dryness, let it be dropped through a proper funnel on clean boards, and the drops will become small cones or pyramids, in which form the lake must be suffered to dry, and the preparation is completed.

Lakes are also made from madder and Brazil wood. The former is much more permanent than the latter, but does not possess the same beauty of tint. In order to make these lakes, strong infusions of these substances are first obtained. The Brazil wood infusion is best made by boiling the chips in pure water, and filtering the solution. (See BRASIL WOOD.) The infusion of madder (see MADDER) is best made in cold water, by which the purest part of the colour is only dissolved. To each of these solutions are added a clear solution of alum, and then as much of an alkali as will precipitate so much of the alumine as will make the colour of the precipitate of proper intensity. A small quantity of muriate of tin increases the brilliancy of these lakes.

A beautiful lake, it is said (*ubi infra*), may be prepared from Brazil wood, by boiling three pounds of it, for an hour, in a solution of three pounds of common salt, in three gallons of water; and filtering the hot fluid through paper, add to this a solution of five pounds of alum in three gallons of water. Dissolve three pounds of the best pearl ashes in a gallon and a half of water, and purify it by filtering; put this gradually to the other, till the whole of the colour appear to be precipitated, and the fluid be left clear and colourless. But if any appearance of purple be seen, add a fresh quantity of the solution of alum by degrees, till a scarlet hue be produced. Then pursue the directions given in the first process with regard to the sediment. If half a pound of feed-lac be added to the solution of pearl ashes, and dissolved in it before its purification by the filter, and two pounds of the wood, and a proportional quantity of the common salt and water be used in the coloured solution, lake will be produced that will stand well in oil or water, but it is not so transparent in oil as without the feed-lac. The lake with Brazil wood may be also made by adding half an ounce of annatto to each pound of the wood; but the annatto must be dissolved in the solution of pearl ashes. There is a kind of beautiful lake brought from China; but as it does not mix well with either water or oil, though it dissolves entirely in spirit of wine, it is not of any use in our kinds of painting. This has been erroneously called *safflower Handmaid to the Arts*, vol. i. p. 61, &c.

In making yellow lakes, the coloured infusions must be such as to make the most permanent dye. (See DYEING.) The precipitation of the colour is performed precisely in the same way, and by the same substances, as the red lakes. A very excellent yellow lake may be made from the infusion of *querciron bark*. That from *turmeric* is very beautiful, but is not permanent. The process for the making of this is as follows: take a pound of turmeric-root in fine powder, three pints of water, and an ounce of salt of tartar; put all into an earthen glazed vessel, and let them boil together over a clear, gentle fire, till the water appears highly impregnated with the root, and will stain a paper to a beautiful yellow. Filter this liquor, and gradually add to it a strong solution of roch-alum in water, till the yellow matter is all curdled, together, and precipitated; after this pour the whole into a  
filter

filtrate of paper, and the water will run off and leave the yellow matter behind. It is to be washed many times with fresh water, till the water comes off insipid, and then is obtained the beautiful yellow, called *laque of turmeric*, and used in painting.

In this manner may a laque be made of any of the tinging substances that are of a somewhat frothy texture, as madder, logwood, &c.; but it will not succeed in the more tender species, as the flowers of roses, violets, &c. as it destroys the nice arrangement of parts in those subjects, on which the colour depends.

A yellow lake for painting is to be made from broom-flower in the following manner: make a ley of pot-ashes and lime reasonably strong; in this boil, at a gentle fire, fresh broom-flowers till they are white, the ley having extracted all their colour; then take out the flowers, and put the ley to boil in earthen vessels over the fire; add as much alum as the liquor will dissolve; then empty this ley into a vessel of clear water, and it will give a yellow colour at the bottom. Let all settle, and decant off the clear liquor. Wash this powder, which is found at the bottom, with more water, till all the salts of the ley are washed off; then separate the yellow matter, and dry it in the shade. It proves a very valuable yellow.

All the lake colours are changed by acids and alkalis. An acid renders the red lake more scarlet, and the yellow paler; while an alkali gives a purple tint to the red, and an orange or brown tint to the yellow. Artists sometimes take advantage of this property to change their colours. The acid used for this purpose should be the muriatic diluted, and the alkali aqua ammonia.

**LAKE, Orange,** is the tinging part of anatto precipitated together with the earth of alum. This pigment, which is of a bright orange colour, and fit for varnish painting, where there is no fear of flying, and also for putting under crystal to imitate the vinegar garnet, may be prepared by boiling four ounces of the best anatto and one pound of pearl-ashes half an hour in a gallon of water; and straining the solution through paper. Mix gradually with this a solution of a pound and a half of alum in another gallon of water; desisting, when no ebullition attends the commixture. Treat the sediment in the manner already directed for other kinds of lake, and dry it in square bits or round lozenges. Handmaid to the Arts, vol. i. p. 119.

**LAKE, Rose.** See *ROSE PINK*.

**LAKE of Madder.** See *MADDER*.

**LAKE, Siberia,** in *Rural Economy*, a common name applied to such as are carried on in lakes, or other stagnant waters. See *FISH and PONDS*.

**LAKE-weed,** in *Botany*. See *ARSMART*.

**LAKEN,** in *Geography*, is a town of Prussia, in the province of Oberland; eight miles E. of Mulhausen.

**LAKSHIMAN,** in *Hindoo Mythology*, an incarnation of the mighty serpent *Sesha*, (which see,) born of Sumitra, second wife of Dasaratha, raja, or king of Ayadela (Oude): Lakshiman was thus the half brother of Rama, and became incarnate for the purpose of assisting him in his wars against Ravana, the tyrant of Lanka. (See *LANKA, RAVANA, and RAMA*.) Lakshiman was farther connected with Rama by espousing Urmila, daughter of Janaka, the adoptive parent of Rama's wife Sita. See *JANAKA and SITA*.

**LAKSHMENI,** one of the eight regular wives of Krishna; and he being the Apollo of the Hindoos, these eight wives may possibly be only a personification of the natural notes. (See *KRISHNA*.) Her name is sometimes written Lakshimany.

**LAKSHMI,** is the faksi or consort of Vishnu, the pre-

servative power of the deity. (See *SAKTI and VISHNU*.) The extensive sect of Vaishnavas, or worshippers of Vishnu, esteem Lakshmi as mother of the world, and then call her *Ada Maya*; and such Vaishnavas as are faksats, that is, adorers of the supremacy of the female energy, or nature-active, worship her extensively as the type of the eternal Being, and endow her with suitable attributes. (See farther hereunder *LINGA, MAYA, and SAKTA, SECTS of Hindoos; VAISHNAVA, and the articles before referred to*.) She is represented by the poets and painters as of perfect beauty. Hindoo females are now commonly named after her: and there are few in the long catalogue of their deities whose various names and functions are so frequently alluded to in conversation and writing, either on theogony, mythology, poetry, or philosophy. Her terrestrial manifestations have been frequent, and her origin various. As Rhemba, the sea-born goddess, she arose one of the fourteen gems from the ocean when churned by the good and evil beings for the amrita or beverage of immortality. (See *RHEMBA*.) She then assumes the character of *Venus Marina*, or *Aphrodites of the Greeks*; who, as Hesiod and Homer sing, arose from the sea, ascended to Olympus, and captivated all the gods. The operation of churning the ocean is noticed under *Kurmatavara*, and the production of Rhemba, Sri, or Lakshmi is thus described in the 36th section of the first book of the *Ramayana*. (See *RAMAYANA*.) "The gods, the asuras, and the gandharvas, again agitating the sea, after a long time appeared the great goddess, inhabiting the lotus; clothed with superlative beauty, in the first bloom of youth, covered with ornaments, and bearing every auspicious sign; adorned with a crown, with bracelets on her arms, her jetty locks flowing in ringlets, and her body, which resembled burning gold, adorned with ornaments of pearl. Thus was produced the goddess Padma, or Sri, adored by the whole universe, Padma by name. She took up her abode in the bosom of Padma-nabha, even of Heri; that is, of Vishnu, of whom these are names. Sri, as this deity is frequently called, distinguishes her more particularly as the goddess of fortune, the word meaning *prosperity*; but it is not given exclusively to Lakshmi. (See *SRI, PADMA, and KAMALA*.) Others of her names are derived from the lotus, which is the emblem of female beauty, and especially applicable to this goddess. (See under these articles.) Heripriya denotes the wife of Heri or Vishnu. As the deity of riches or fortune Lakshmi would be invoked for increase of wealth, by a desiring Hindoo, rather than Kuvera, the Pluto of their Pantheon. (See *KUVERA*.) In this character she is sometimes called *Lucki*, or *Laki*, meaning *fickle*; and it may be only a shortening or rapid pronunciation of Lakshmi, her most common name, which is derived from the Sanscrit word *laksh*, *light, splendour*; equivalent to the Latin *lux*, and it means farther *luck, luxury, fortune*, &c. This goddess (as the faksi, or consort of Vishnu, or Krishna) being the energy of the sun, is appropriately designated by a luminous appellation derived from such a source.

In images and pictures of her, which are very common in India, Lakshmi is generally represented as a mere woman; sometimes, however, four-armed; often holding a *kumal*, or lotus, in an easy and elegant attitude, and always very handsome. With her lord Vishnu she is frequently seen on the serpent *Sesha*; he reposing, she in respectful attendance, while a lotus springing from Vishnu's navel to the surface of the sea (for this scene is subaqueous) bears in its expanded calyx, Brahma, the creator of the world, about to perform the work of renovation. (See *KALPA and SETHA*.) Sometimes she is seated with her lord on *Garuda*, or *Superna*, cleaving the air, of which Vishnu is a personification. (See *SUTERNA*.)

SUPREMA.) In Vishnu's most splendid avatara, or incarnation of Krishna, she became manifested as Rukmeni, or Radha, the most adored of the amorous deities, and mother of Kama, the god of love; here again corresponding with our popular Venus, the mother of Cupid. (See KAMA, KRISHNA, RADHA, and RUKMENI.) In the avatara of Rama, Lakshmi was his faithful spouse in the form of Sita, as noticed under those articles. In that of Narasingha, she was Narisinh, or Nrisinh; when Varaha, Varahi; and as the Sakti of Narayana she is by her own sectaries called Narayani; and in most of the many incarnations of Vishnu she appears to have defended with him, frequently under her own celestial name: as his consort generally, she is called Vainhavi. See respectively those articles.

The following extract from Moor's Hindoo Pantheon will shew the veneration paid to this popular and beneficent deity, of whom a milch-cow seems an apt symbol. "In the Sradha, or obsequies in honour of deceased ancestors, Lakshmi is, among other deities, earnestly invoked, particularly when, as the ritual expresses, a votary is desirous, by gifts to Brahmans, of obtaining celestial bliss for the defunct." A donation of a milch-cow is attended by many appropriate ceremonies, finishing with the following prayers; the acceptor holding, during the recital, the sacred animal by the tail.

1. May the goddess, who is the Lakshmi of all beings, and resides among the gods, assume the shape of a milch-cow and procure me comfort.

2. May the goddess, who is Rudrani in a corporeal form, and who is the beloved of Siva, assume the shape of a milch-cow and procure me comfort.

3. May she, who is Lakshmi reposing on the bosom of Vishnu; she, who is the Lakshmi of the regent of riches; she, who is the Lakshmi of kings, be a boon-granting cow to me.

4. May she, who is the Lakshmi of Brahma; she, who is Swaha, the wife of fire; she, who is the exerted power of the sun, moon, and stars, assume the shape of a milch-cow for my prosperity.

5. Since thou art Swadha, the food of them who are the chief among the manes of ancestors, and Swaha, the consuming power of them who eat solemn sacrifices; therefore, being the cow that expiates every sin, procure me comfort.

6. I invoke the goddess, who is endowed with the attributes of all the gods, who confers all happiness, who bestows abodes in all the worlds, for the sake of all people.

7. I pray to that auspicious goddess for immortality and happiness. P. 138.

Under the following names and words some particulars will be found of the mythological persons mentioned in the preceding extract, not before referred to from this article. Sradha, or obsequies in honour of departed ancestors. Rudrani, the beloved of Siva, a name of Parvati. Surrabhi, the boon-granting cow. Swadha, Swaha, the fakti, or energy of Pavaka, or fire.

Lakshmi also presides over marriages, and is considered, indeed, among certain sects of Hindoos, as the general source of all happiness. She is found, by mythologists, to have characteristic attributes and powers similar to the Ceres of the Greeks (Sri is, in one case, Sris, corresponding here, likewise, in name), and the Isis of the Egyptians. On these, and other points connected with the subject of this article, see Mr. William Jones, and Mr. Colebrooke, Asiatic Res. vol. i. iii. and vii. Many plates of her in her various forms, and Puranic legends and anecdotes, are like-

wife given in Moor's Hindoo Pantheon, whence this article is chiefly taken. See also GENTOO.

LAKTEA, in *Geography*, a sea-port of Sweden, in East Bothnia, at the mouth of a river near the gulf of Bothnia. N. lat. 64° 25'.

LALA, in *Ancient Geography*, a town of Asia, in the Greater Armenia.

LALADA, in *Geography*, a town of Hindoostan, in Golconda; 15 miles W.N.W. of Calloor.

LALAMSERAI, a town of Hindoostan; 28 miles W. of Benares.

LALAND. See LAALAND.

LALANDE, JAMES DE, in *Biography*, was born at Orleans in 1622, and became distinguished in the profession of the law. He was famed as well for his extensive and very profound erudition, as by the public and private virtues which he manifested, in passing through a long life, in the exercise of various important functions. He attained to the highest rank in his profession in his native place, and was made mayor. He died in 1703, sincerely regretted by all who knew him; he was author of several works, of which the most important were "A Commentary upon the Customs of Orleans;" and "A Treatise on the Bar, and Arricr-bar." His integrity, beneficence, and zeal for the interests of his countrymen, obtained for him the honourable title of "father of the people." Moreri.

LALANDE, JOSEPH, JEROME LE FRANÇAIS, a celebrated French astronomer, was born at Bourg, in the department of P'ain, on the 11th of July 1732, of very respectable parents. His father, who was possessed of property, intended him for the bar, and accordingly sent him to Paris to study the law, to which, for some time, he applied with so much assiduity, as to more than answer the most sanguine expectations of his friends, when the sight of an observatory awakened in him a propensity, which deranged the projects of his parents, and became the ruling passion of his life. He put himself under the instructions of Le Monnier, one of the then most celebrated astronomers of France, and profited so much by the lessons of his able instructor, as to afford him the highest degree of satisfaction, who, on his part, conceived for the young man a truly paternal affection, and was determined to promote his interests. An opportunity soon offered; the great astronomer Leccaille was preparing to set out for the Cape of Good Hope, in order to determine the parallax of the moon, and its distance from the earth. To accomplish this purpose, it was necessary he should be seconded by an observer placed under the same meridian, and at the greatest distance that could be conveniently chosen on the globe. Berlin was fixed on, and Le Monnier signified his intention of undertaking the business himself, but the moment when he should be ready to depart, he had the credit to get his pupil appointed in his stead. Frederic, to whom Maupertuis had explained the delicacy and difficulty of the enterprise, could not forbear shewing some astonishment when the youthful astronomer was presented to him, "However," said he, "the Academy of Sciences has appointed you, and you will justify their choice." From that moment his age, being only eighteen, was an additional recommendation; he was admitted at court, welcomed by the academy, and became intimate with the most distinguished persons at Berlin. On his return, the account which he gave of his mission procured him free access to the Academy of Sciences, and its Transactions were enriched every year by important communications from the young astronomer; "the active part which he took in the labours of the academy, was not confined to the astronomical science, we have from his pen, a description of seven arts, as different from each other, as they are re-

note from the objects of his habitual meditations." He published the French edition of Dr. Halley's tables, and the history of the comet of 1759, and he furnished Clairault with immense calculations for the theory of that famous comet. Being charged in 1760 with the compilation of the "Cronnoique des Temps," he entirely changed the form of that work, and of this collection he published thirty-two volumes, viz. from 1775 to 1807.

In 1764, appeared the first edition of his "Traité Astronomique," which he afterwards completed, and upon which his chief claim to glory rests. Lalande was the first who calculated the perturbations of Mars and Venus, and in the theory of Satellites, in which but little progress had been made, he explained a motion which Baillic claimed as his own discovery. A literary dispute arose out of this circumstance, which, however, was conducted with every regard to decency, and the probable result, as seen by disinterested spectators, was, that both had been led to the same discovery. He composed all the astronomical articles for the "Encyclopædia of Yverdon;" those for the supplements to the "Encyclopédie de Paris;" and those for the "Encyclopédie Methodique," substituting for the articles furnished by d'Alembert, and which he had compiled from the works of Le Monnier, such as were more complete and more modern, from his own observations and improved theories.

To his written works he joined oral instructions during a space of forty-six years; for from the year 1761 he had replaced the first master, De Lisle, in the chair of astronomy, in the college of France, and gave a new lustre to this curious part of public instruction in a celebrated school, which possessed the most distinguished professors of every kind, and which enjoyed and merited the extraordinary privilege of outliving the tremendous storms of a revolution, and escaping the almost universal destruction which levelled all around it. As a professor, he taught with so much ability that his school became a seminary of disciples who peopled the different observatories of the world. In the midst of his other labours he drew up his "Voyage d'Italie," the most complete collection of curious objects that travellers can consult; his "Traité des Canaux;" and his "Bibliographie Astronomique," which is an immense catalogue of all the works that have appeared on the subject of that science.

In the year 1793, Lalande published "Abrégé de Navigation historique, théorique, et pratique," containing many valuable rules and tables; and in 1802 he published a new edition of Montucla's history of mathematics, in 4 vols. 4to. the last two volumes being prepared from Montucla's papers, with the assistance of La Place, La Croix, and other French mathematicians. He published also this year a collection of tables of logarithms, sines, tangents, &c. adapted to the pocket.

Affiliated to almost all the distinguished scientific societies in the world, he was their common bond of union by the correspondences which he maintained; and he promoted a circulation of intelligence from one to another. He employed the credit arising from the universal reputation which he enjoyed, for the general benefit of the sciences and their cultivators. To the extraordinary ardour and activity of his character, he joined a love for the truth, which he carried to the borders of fanaticism. Every degree of concealment appeared to him unworthy of an honest man, and he therefore, without reserve, uttered his sentiments on all occasions, and by the bluntness of his manners, he sometimes made himself enemies, who not only called in question his real merits, but who excited against him a crowd of detractors, and because they could not rival his high reputation, they attempted to blast his well earned fame. He was not without his singu-

larities and failings, but they were trifling in comparison of his commendable qualities, yet his long and important services were frequently forgotten in the recollection of trivial failings.

In a work, not of the most liberal cast, now under publication, in this country, Lalande has been charged with profaneness and atheism, but no authority is produced to support such charges, which, if true, ought to have been sanctioned by some sort of proof, or by well ascertained facts; and if not true, the editors of that work are guilty of a crime against society not easily obliterated. One of his eulogists says, "he always manifested a benevolent disposition, and approved himself a man of honour, probity, courage, full of activity for all useful things, and of love and zeal in behalf of his fellow creatures. To imitate the great benefactor is the most worthy homage we can pay to the infinite goodness; the supreme intelligence which governs the universe." He rendered inextinguishable service to science during his life, and consulted its interests after his death, by founding an annual prize to the author of the best astronomical memoir, or most curious observation. He died April 4th 1807, in the 75th year of his age. Eulogy pronounced over his grave by De-Lambre and Dupont.

LALANDE, MICHEL RICHARD DE, master of the king of France's band, maitre de chapelle, and composer in ordinary of the chapel royal, and chevalier de l'ordre de St. Michel, born in 1657, was the fifteenth son of a tailor at Paris, and brought up a chorister of St. Germain l'Auxerrois. Excited by a strong passion for music, he soon surpassed his master Chaperon. The violin was the first instrument to which he seriously applied; but being recommended to Lulli, as a performer in the opera orchestra, he was so piqued at being rejected, that he broke his fiddle, and renounced the practice of it for ever. The era of his prosperity was, the being employed in teaching mademoiselle de Noailles, who married the Maréchal de Grammont, and the Maréchal paid for many kind things of him to the king, that he was appointed music-master to mademoiselles de Blois, and de Nantes. In 1683, his majesty having created two new places of chapel-masters, gave one of them to Lalande, whose compositions pleased the king so much that he appointed him successively to the two places of chapel-master, that of chamber-musician to his majesty, and master of his band; and soon after conferred on him the order of St. Michel. The king married him to Anne Ribel, who had an admirable voice, and sang wonderfully. He had only two daughters by this marriage, whom he lost in 1711 at 24 years of age. In 1721 he lost his spouse, and the year following, wanting consolation and a companion, he married the demoiselle de Cury, daughter of the furgoon to the prince of Conti, but soon after being seized with a consumptive cough, and pain in his chest, he died in 1726 at 67; 45 years of which time he had spent in the service of Louis XIV. and XV. Lalande left behind him 60 motets, or anthems, which have had the highest reputation, and set several operas, but he never would let any of them be performed under his name. It was under this able master, (says M. Laborde, the zealous defender of French music of every kind,) that a new species of church music had birth, which astonished and ravished the whole court. "He banished the usual monotony and dryness of the chorusses and recitatives. His fugues were composed on lively subjects, and mixed with agreeable symphonies, and agreeable melodies, which, before his time, had no existence. He was the first who had the time beaten by a coryphæus, and composed pathetic recitatives, and airs of spirit. In short, he was the creator of church music, and even foreigners, since the time

of Lalande, give the French the pre-eminence in this kind of music, over all the nations of Europe." *Essai sur la Musique*.

The English, the Germans, and the Italians, we presume, will dispute this point with M. Laborde, and remind him of their Purcell, Handel, Leo, &c. We heard some of this sublime music, at the Concert Spirituel, in 1770; and in looking back at our memoranda for the effect which it had on our feelings, we found that it was coarse and noisy, with scarcely a new passage to make amends for the worst singing which we had ever heard, in or out of the church.

**LALANG**, in *Geography*, an island near the N. coast of Sumatra, in the straits of Malacca. N. lat.  $1^{\circ} 45'$ . E. long.  $99^{\circ} 20'$ .

**LALASIDE**, in *Ancient Geography*, a country of Asia Minor, which, according to Ptolemy, made part of Cilicia, so called from the name of Lalasis, its capital. In the 4th century of the Christian era, when the province of Iauria was formed of a part of Cilicia and Cataonia, this country became a part of Iauria.

**LALASIS**, a town of Asia Minor, in Iauria.

**LALBENQUE**, in *Geography*, a town of France, in the department of the Lot, and chief place of a canton, in the district of Cahors. The place contains 1924, and the canton 9750 inhabitants, on a territory of 305 kilometres, in 13 communes.

**LALCOTTA**, a town of Hindoostan, in Golconda; 17 miles N.E. of Rachore.

**LALI**, a town of Thibet; 90 miles S. of Sarangpou.

**LALIBALA**, a town of Abyssinia; 140 miles S.S.E. of Gondar.

**LALIBALA**, a town of Abyssinia; 90 miles S.S.E. of Gondar.

**LALIM**, a town of Portugal, in the province of Beira; nine miles S.W. of Lamego.

**LALINDE**, a town of France, in the department of the Dordogne, and chief place of a canton, in the district of Bergerac. The place contains 1606, and the canton 8208 inhabitants, on a territory of 185 kilometres, in 16 communes.

**LALLARY POINT**, a cape on the S.W. coast of the island of Banca. N. lat.  $2^{\circ} 48'$ . E. long.  $106^{\circ} 2'$ .

**LALM**, a town of Silesia, in the principality of Jauer; 20 miles W. of Jauer.

**LALODA**, a town on the W. coast of the island of Gilolo. N. lat.  $1^{\circ} 48'$ . E. long.  $127^{\circ} 22'$ .

**LALOO**, a town of Hindoostan, in Bengal; 20 miles E. of Silhet.

**LALOUETTE**, in *Biography*, an élève of Lulli, beat the time at the opera in Paris, and composed the music of several ballets and intermedes. He was one of the best performers on the violin of his time, was also music-master at Notre Dame, and died in 1728, aged about 75.

**LALPET**, in *Geography*, a town of Hindoostan, in the Carnatic; 74 miles N. of Arcot.

**LALSK**, a town of Russia, in the government of Volgodga, on the river Luza; 40 miles E. of Ufing. N. lat.  $60^{\circ} 50'$ . E. long.  $47^{\circ} 14'$ .

**LALSOOND**, a town of Hindoostan, in the subah of Aginere; 10 miles N. of Rantampour. N. lat.  $26^{\circ} 44'$ . E. long.  $76^{\circ} 55'$ .

**LALVITON**, a town on the W. coast of the island of Samar. N. lat.  $11^{\circ} 35'$ . E. long.  $124^{\circ} 52'$ .

**LAMA**, a town on the W. coast of the island of Celebes. S. lat.  $1^{\circ} 48'$ . E. long.  $119^{\circ} 15'$ .—Also, a town of Naples, in Abruzzo Citra; 12 miles E. of Sulmona.

**LAMA**, or *Lamas*, the title of an order of priests among

the western Tartars, on the frontiers of China, and particularly in Thibet, who are held in great veneration. Lama, in their language, is a priest or minister of religion; and Lamilla is the wife of the Lama.

About the year 1426, the bonzes of Thibet assumed the title of "Grand Lama." The most powerful among them made Lassa the place of his residence, and was acknowledged chief of all the lamas. He established the law respecting the yellow cap; for it must be observed, that there are two kinds of lamas, distinguished by red and yellow caps. His successor was the first who appointed a "typa," or prime minister, whom he entrusted with the government of his states. The next in order was the first who took the distinguishing title of "dalai-lama," by which he was raised far above the rest; for "dalai" signifies "morally and physically extended, great, and almost without bounds." The lama princes, however, were not sole sovereigns of Thibet. The dalai-lama was indebted to a prince of the Tartars of Kokonor, named Kouchi, for his sovereignty over all Thibet; and in order to continue his protection to him, he established himself, together with his troops, in the neighbourhood of Lassa. In 1714, the Eleuthes made an irruption into Thibet, committed the most horrid ravages, put a great number of the lamas to the sword, and sent several of them into Tartary, inclosed in sacks, and thrown on the backs of camels. Their king pretended to be the only and real sovereign of Thibet; and ordered the lamas to renounce their authority over the people, to retire to their monasteries, and to employ themselves only in saying their prayers. The dalai-lama lost no time to implore the protection of the emperor Kang-hi; who assembled a numerous army, and caused it to march into Kokonor, from whence he drove the king of the Eleuthes, and then entered Thibet; while another body of Chinese troops penetrated thither also by the province of Set-tchuen. The dalai-lama was re-established, and the rest of the lamas were put in possession of their pagodas. Those that remained of the troops of the Eleuthes made their escape through the defiles of the mountains; and as the reigning emperor has ever since protected Thibet, the Thibetians have nothing more to fear from the incursions of the Eleuthes, who, since 1759, have been subjects of the empire. The tribute which the sovereign of Thibet sends to the emperor of China consists generally of gold or copper statues of the god "Fo," perfumes, amber, coral, precious stones, woollen stuffs, and sword-blades. The emperor also requires from the dalai-lama a certain number of vessels or small pitchers, filled with water from the Ganges. Ever since the expulsion of the Eluth Tartars, the kingdom of Thibet is regarded as depending on the emperor of China, which they call Cathay; and at Lassa, the capital, two mandarins reside, with a garrison of 1000 Chinese to support the government; but their power does not extend far; for in reality the lama, whose empire is founded on the surest grounds, personal affection and religious reverence, governs every thing internally with unbounded authority. It is well known, that the dalai-lama is the great object of adoration for the various tribes of Heathen Tartars, who roam through the immense tract of continent which stretches from the banks of the Volga to Corea, on the side of Japan;—the most extensive religious dominion, perhaps, on the face of the globe. He is not only the sovereign pontiff, the vicegerent of the deity on earth; but as superstition has ever the greatest influence, where it is removed farthest from its object, the more remote Tartars absolutely regard him as the Deity himself. They believe him immortal, and endowed with all knowledge and virtue. They annually assemble from different parts to worship

ship and make rich offerings at his shrine; and even the emperor of China does not fail to make acknowledgments to him in his religious capacity, and actually to entertain at a great expence, in the palace of Peking, an inferior lama, deputed as his nuncio from Thibet. According to Mr. Turner's account, the Tibetians conceive of him as immaculate, immortal, omnipresent, and omniscient. They view him only in the most amiable light, as perpetually absorbed in religious duty; and when called to bestow attention on mortal beings, as employed only in the benign office of distributing consolation by his blessing, and in exercising the first of all attributes, forgiveness and mercy. He is also the centre of all civil government, which derives from his authority all its influence. It is the orthodox opinion among the votaries of the grand lama, that when he seems to die either of old age or of infirmity, his soul only quits a crazy habitation to seek another and better; and that it is discovered again in the body of some child, by certain tokens known only to the lamas or priests, in which order he always appears. The dala-lama, who presided in Thibet in 1774, when Mr. Bogle was commissioned by the governor-general of Bengal to visit that country, was an infant; and was discovered a few years before by the Teshoo lama, who, in authority and sanctity of character, was next to him; and, consequently, during the other's minority, acted as chief. The residence of the dala-lama is at Pateli, or Pontela, an immense palace on a mountain near the banks of the Burrampooter, about seven miles from Lassa. On this mountain there are many pagodas, in the most sumptuous of which he resides. He passes great part of his life on a kind of altar, where he sits motionless, in a cross-legged posture, on a large and magnificent cushion, and receives with the greatest gravity the adorations, not only of the Thibetians, but of a great multitude of pilgrims, who undertake long and difficult journeys to go and worship him on their bended knees, and to receive his benediction. The grand lama salutes no one; he neither uncovers nor rises up to any person, whatever his rank may be; with the same eyes he beholds at his feet the greatest princes and the meanest of his subjects. He contents himself with laying his hand on the head of his worshipper, who imagines that he obtains, by this imposition alone, the remission of all his sins. His votaries conceive, that all the divinity of "Fo" resides in him; and they ascribe to him all the attributes and prerogatives already mentioned. Their whole care is employed in discovering the place where it shall please him to be born again; and even some of the Tartar princes themselves have assailed in this interesting search; but they are obliged to be directed by certain lamas, who alone are acquainted with the signs by which the new-born god may be discovered, or rather, they only know what child the preceding dala-lama appointed to be his successor. The Teshoo-lama has several palaces or castles. The castle in which the lama resides is built of stone or brick, with many courts, lofty halls, terraces, and porticos; and the apartments are in general rocky, and highly finished in the Chinese stile, with gilding, painting, and varnish. Stair-cases and windows are conveniences to which they are utter strangers. There is no access to the upper rooms but by a sort of ladders of wood or iron; and in lieu of windows they have holes in the ceilings, with pent-house covers, contrived so as to shut up on the weather-side. Firing is so scarce, that little is used except for culinary purposes; and they trust altogether for warmth in their houses to their furs and other clothing. In the northern parts of Thibet there are gold-mines, which are the reserved property of the lama, and rented out to those who work them. Particular and discriminating respect is paid

to the sovereign lamas after their death. The bodies of these are deposited entire in shrines prepared for them, which are ever after considered as sacred, and visited with religious awe; whereas the bodies of inferior lamas are usually burnt, and their ashes preserved with great care in little metallic idols, which have places assigned them in their sacred cabinets.

The lamas, who form the most numerous as well as the most powerful body in the state, have the priesthood entirely in their hands; and besides they fill up many monastic orders, which are held in great veneration among them. The inferior gradations, from the president of a monastery, who is always styled lama, in addition to the name of the station to which he belongs, are Gylong, Tohba, and Tuppa. On the establishment of the monastery of Teshoo Loomboo, there were reckoned at that period no less than 3700 gylongs for the performance of daily service in the Goomba, or temple; and four lamas, chosen from among them, superintend and direct their religious ceremonies. (See GYLONGS.) Youth intended for the service of the monastery are received on the establishment at the age of eight or ten years, and then called "Tuppa;" at fifteen they are usually admitted into the order of "Tohba;" and from that of Tohba, if they are found, upon examination, duly qualified, they are advanced to the class of Gylongs, between the age of 21 and 24; and with sufficient interest, they may then be promoted to the superintendance of some endowed monastery, and obtain the rank of lama. The priests are habited in long robes of yellow cloth, with a conical cap of the same colour, having flaps to fall down and cover the ears. This peculiarity of colour distinguishes one of the two religious sects that divide almost the whole of Tartary, from Turkestan to the eastern limits of this continent. The other colour is red; and the tribes are known as belonging to the red, or yellow cap. The former descends principally from the sectaries of the yellow, in allowing the marriage of their priests. But the latter are considered as the most orthodox, as well as possessed of the greatest influence. The emperor of China is decidedly of this tribe, and has sanctioned his preference of the yellow colour, by a sumptuary law, which limits it to the service of religion, and the imperial use. The two sects are distinguished by the appellations of Gyllookpa and Shammar; the former having adopted the yellow colour, and the latter the red. Three lamas are placed at the head of each sect; Dala-lama, Teshoo-lama, and Taranaut-lama, preside over the Gyllookpa, who have their residence at Pootalah, Teshoo Loomboo, and Kharka. This sect prevails over the greatest part of Thibet, and a division of it is established in a province of the Deccan, called Seerra, or Sirrore. In like manner three lamas also preside over the Shammar, and have their residence in Bootan, in separate monasteries. Great contentions formerly prevailed between these sects; and the Shammar was under a necessity of retiring, and of fixing in a tract of country bordering on Thibet, towards the south, marked by a line, insupportable and intemperate in the extreme. Here they established themselves, as in a secure asylum; while others, styled Dukba, still live in tents and tend their flocks in a vagrant state. But to return from this digression.—The inhabitants of Thibet are not the only people who may attain to the dignity of lama. Tartars, and even Chinese, have aspired to the priesthood, and repaired to Lassa in hopes of obtaining it. If they can be admitted among the disciples of the grand lama, the number of whom is fixed at 200, they consider their admission as the commencement of their promotion, and the first step towards dignity and power; the subaltern grand lama being chosen from among these disciples. When

they have arrived at this dignity, they live in splendour and opulence, and are continually surrounded by a crowd of admirers, who lead them with presents. The richest and most considerable of the Tartar lamas, who inhabit Thibet, are those whom the Chinese call "Mong-fan;" they possess extensive domains to the north of the province of Yun-nan, between the beautiful rivers of Kinche-kiang and Vou-leang. These lands were granted to them by Oufan-guei, who became master of Yun-nan, when the Mantchew Tartars subdued China, in order to bring them over to his party, and that by their means he might gain the support of all the lamas of Thibet. Although the Mantchew Tartars had never any lamas, they no sooner undertook the conquest of China, than they protected them openly through policy; and soon after, government caused magnificent pagodas to be erected for them. The example was followed by a great number of princes, princesses, and wealthy people, who vied with one another in zeal for building temples for them, and thus the lamas greatly multiplied in China. They are also rich there; for most of these lamas appear in public in vestments of red and yellow satin, ornamented with the most valuable furs. They are all mounted on excellent horses, and followed by a number of domestics, corresponding to their rank as mandarins; for the emperor permits them to carry a cushion and the other badges of dignity which belong to the quality of mandarin. The lamas of Thibet are less magnificent in their dress; wearing only a napped kind of woollen stuff, called in China "poulou," which is used for covering seats, because it generally lasts long and retains its colour. Besides a cap, the lamas have several bonnets, or tiaras, that are the distinguishing marks of the different degrees of honour to which they have arrived. The cap, which strikes the European most, very much resembles a bishop's mitre: it is worn by them on horseback as well as on foot. The obligations which the office of lama imposes are neither few nor trifling; but there is not one among them who engages to discharge them all. They divide and share the burden. One takes the charge of observing one precept, and another obliges himself to practise another. They have also certain common prayers, which they chaunt in a very agreeable manner; and they are obliged to renounce the vanities of the world, to live in celibacy, and to have no concern in trade or commerce.

The lamas are extremely superstitious, and much addicted to magic. Großer's China, vol. i. Phil. Trans. vol. lxvii. part ii. Turner's Account of an Embassy to the Court of the Teshoo Lama, in Thibet, 1806.

LAMALMON, in *Geography*, a lofty mountain and spacious district of Abyssinia, where is the pass through which the road of all caravans to Gondar lies; and where they take account of all baggage and merchandise, which they transmit to the Nagadé Ras, or chief officer of the customs at Gondar. Here is also levied, with great rigour, and for the most part with injustice, a payment due to the proprietor of the ground. From its base this mountain has the appearance of being sharp-pointed; but on the top of it is a large plain, called Lama, part laid out in pasture, but the greater part bearing grain. It abounds with springs, and seems to be the great reservoir from which arise most of the rivers that water this part of Abyssinia. A multitude of streams issue from the summit in all directions; the springs boil out from the earth in large quantities, capable of turning a mill. They plough, sow, and reap here at all seasons; and the husbandman must blame his own indolence, and not the soil, if he has not three harvests. In one place, says Mr. Bruce, we saw people

busy cutting down wheat; immediately next to it, others at the plough; and the adjoining field had green corn in the ear, and a little further, it was not an inch above the ground. Lamalmon is on the N.W. part of the mountains of Samen: that of Gingerohla, with two pointed tops, joins it on the north; but neither Lamalmon nor Gingerohla, though higher than the mountains of Tigre, are equal in height to some of those of Samen. The mercury in the barometer on the top of Lamalmon stood at 20½ English inches. The language of Lamalmon is Amharic; but there are many villages where the language of the Falaha is spoken. These are the ancient inhabitants of the mountains, who still preserve the religion, language, and manners of their ancestors, and live in villages by themselves. Their number is considerably diminished, and they are now wholly addicted to agriculture, hewers of wood, and carriers of water, and the only potters and masons in Abyssinia. In general they live better than the other Abyssinians, which they, in revenge, attribute to their skill in magic, not to superior industry. Their villages are generally strongly situated out of the reach of marching armies, or otherwise they would be constantly rilled, partly from hatred, and partly from hopes of finding money. The river Macara is the boundary between Lamalmon and Waggora; and the latitude of some small villages called Macara was 13 6' S. Bruce's Travels, vol. iii.

LAMANON, ROBERT PAUL, in *Biography*, a member of the Academy of Sciences at Paris, and member of the Museum in the same city, was born at Salon, in Provence, in 1752, of an old and respectable family. He was destined for the church, and sent to Paris to complete his theological studies. He rose to the dignity of canon, but by the death of his father and elder brother he came into property, which enabled him to follow the bent of his inclinations, by devoting himself to the physical sciences. He travelled through Provence and Dauphiné, and scaled the Alps and Pyrenees: "at the sight of these vast natural laboratories the bent of his mind burst forth instantaneously; he climbed to the summit of rocks, and explored the abyss of caverns, weighed the air, analysed specimens, and, in this ardent fancy, having attained the secrets of creation, he formed a new system of the world." Upon his return home, he applied with great ardour to the study of meteorology, natural philosophy, and the other branches of the history of nature. He spent three years at Paris, and gave to the learned societies there many very valuable papers, particularly a memoir on the Cretans, a memoir on the theory of the winds, and a treatise on the alteration in the course of rivers, particularly the Rhone. He again visited Switzerland and Italy, going first to Turin, where he allied himself to the learned of that country; after his return, laden with the spoils of the countries which he traversed, he employed himself in the arrangement of the interlocking fruits of his journey. It was at the time when Lamanon was preparing for the press his great work on the "Theory of the Earth," that the French government conceived the vast project of completing the discoveries of captain Cook: the Academy of Sciences was entrusted with the care of selecting men capable of rectifying the common notions of the southern hemisphere, of improving hydrography, and advancing the progress of natural history; they invited, at the recommendation of the illustrious Condorcet, Lamanon to share the danger, and to partake in the glory, of this great enterprise. He eagerly caught at the offer, haled to Paris, refused, in a conference with the minister, the salary offered him, and taking a hasty leave of his friends, departed for Brest. On the 11th of August,

1785, the armament fell under the orders of La Perouse, an experienced commander: the commencement of the voyage was highly prosperous. After some delays, and having embraced every opportunity of making observations, the vessels arrived at the island of Maouina, one of the southern Archipelago. Lamanon, eager to assure himself of the truth of the accounts of that country, debarked with Langle, the second in command. Having explored the place, and being upon the point of returning, they were attacked by the natives; a combat ensued, and they, with several of the boat's crew, fell a sacrifice to the fury of these barbarians. Thus perished Lamanon, a young man ardent in the pursuits of science, disinterested in his principles, and a zealous advocate for the interests of freedom. His eulogist, M. Ponce, said of him, "that he seemed born to bring about a revolution in science; the depth of his ideas, the energy of his character, the sagacity of his mind, united to that lively curiosity, that can draw instruction out of every thing which he saw, and which leaves nothing unexplored, would have led him to the most valuable discoveries."

LAMANTEA, in *Geography*, a town of Naples, in Calabris Citra; 12 miles S.W. of Cofenza.

LAMARCKIA, in *Botany*, is a cryptogramic, and, in every sense, very obscure genus of marine plants, founded by the Abbate Joseph Olivi, in his *Zoologia Adriatica*, an Italian work in quarto, published at Bassano in 1792, and treating of various matters relative to the natural history of the gulf of V-nice. What relates to the present genus is copied into Ulteri's *Annalen*, &c. 7. 76. It was named in honour of the celebrated French botanist John Baptit Monet, Chevalier de la Marck, who, since the French revolution, has adopted *Lamarck* as his surname. His indefatigable application and skill in the science of botany, are evinced by his *Dictionnaire*, and his *Illustration des Genres*, so often quoted by us. He has, however, for some time withdrawn himself from the former work, devoting his attention to conchology. Of his claims to botanical commemoration, there can be no doubt; but he has already received this reward of his labours, in the *Monetia* of L'Heritier, adopted in Willdenow, Sp. Pl. v. 1. 669, and the new edition of Hort. Kew. v. 1. 264; nor can we on any occasion consent to the unauthorised and truly foolish contrivance, of naming two different genera after one and the same person. If we retain the *Butea* of Koenig, for instance, it must be in honour of the late marchioness of Bute, not of the first earl, already justly immortalized in the *Stuaritia* of Linnæus. It is however extremely probable that Olivi might be ignorant of the *Monetia*; or he might prefer for it the name *Azima*, subsequently given by Lamarck himself, but whose meaning we know not. See his *Diët.* v. 1. 343.

The *Bursa marina* of Cæsalpinus and Bauhin, and the *Vermilura retusa* of Imperato, have given occasion to the establishment of the present genus, whose character is thus given by Olivi.

Plant rooted, somewhat coriaceous, soft, composed of minute bladders, perpendicular to the axis, which are membranous, green, cylindrical, approximated, terminating at each end in very slender, tubular, connecting filaments. *Frustrification* consisting of small globes, scattered among the bladders and filaments.

The species are

1. *L. Bursa*. Pouch Lamarckia. (*Alcyonium Bursa*; Linn. Syst. Nat. v. 1. 1295. Pallas Zooph. 352. *Bursa marina*; Cæsalp. 608. Bauh. Pin. 368. *Fucus Bursa*; Tern. Hist. Fucor. v. 3. 6. t. 136. Engl. Bot. t. 2183.)

—Globose, depressed, hollow, with fine, scattered, internal threads.—Found in the sea in various places, especially upon limestone rocks, most commonly attached by its roots to some small calcareous fragments. "Each plant is a hollow spongy ball, from one to ten inches diameter, green, composed of entangled, pellucid, jointed fibres, bearing numerous concentric oblong vesicles, whose obtuse summits, reaching to the outside of the ball, give it a papillary or velvety appearance. Such at least was the structure of the specimens described in Engl. Bot. nor have we found the bladders connected at each end with the filaments. The roots were attached to fragments of shells. No fructification could be detected, and the plant was referred to *Fucus*, after Mr. Turner's example, merely till the whole subject of submarine plants should be better understood. Olivi says, that when cut it contracts mechanically, by means of the internal fibres, which he supposes gave rise to the opinion of its being an animal, or *Alcyonium*."

2. *L. Vermilura*. Branching obtuse Lamarckia. *Vermilura ritula*; Imperat. Hist. Nat. 646. *Ulva decorticata*; Woodw. Tr. of Linn. Soc. v. 3. 55.)—Branched, somewhat forked, cylindrical, and obtuse.—Native of the Mediterranean sea, in deep water.—This has the form of *Fucus loreus*, with a resemblance in its surface and colour to *F. tomentosus*. Mr. Woodward, who saw but one specimen, brought from the Mediterranean, found great difficulty in settling its genus. Its structure resembles an *Ulva* stripped of the cuticle. There can be little doubt of its generic affinity to the above. S.

LAMARCKIA is also the name of a genus established by Moench, and adopted by Decandolle in his new edition of Lamarck's *Flora Française*, v. 3. 30, as well as by Bivona Bernardi, in his *Secularum Plantarum, Centuria 1*, n. 46. This genus consists of one species only, as far as we are informed on the subject, which is *Cynofurcus aureus* of Linnæus, figured in the *Flora Græca*, t. 79, a beautiful grass, but we are at a loss to imagine any character by which it can be separated from *Cynofurcus*; see that article.

A New Holland shrub, belonging to *Tetrandria Monogynia*, has been called *Lamarckia dentata*, in Donn's *Hort. Cantabr.* ed. 5. 32. We are not acquainted with its characters, but presume it is what some have named *Hoya ferrata*.

LAMAS, in *Geography*, a town of Portugal, in the province of Tras los Montes; 18 miles S.W. of Braganza.—Also, a town of Spain, in Galicia; 15 miles E.S.E. of Lugo.—Also, a town of Peru, in the diocese of Truxillo; 180 miles E.N.E. of Truxillo.

LAMB, in *Agriculture*, a general name applied to the young of the sheep kind. When lambs come early in the season, great care should be taken to keep them dry and warm, as well as to provide a plentiful supply of food for the ewes, and always to let them have the driest pastures, as without due attention to such circumstances, much loss will frequently be sustained by their dying, or remaining long in a weakly state, almost without growth.

It is observed by Mr. Young, that "there is no business on a farm that demands more care, attention, and assiduity," than that of ewes in lambing season. "As soon as the farmer looks for the ewes beginning to lamb, they ought, he thinks, every night to be folded in the standing littered fold, on one side of which there should be a small cottage hut, built to be warm, with a chimney and stove for heating milk, and a bed for the shepherd to lie down upon. Here he is to sleep through the lambing season, that he may be ready to watch, assist, and tend any ewes that he sees very near lambing,

ing, and, if necessary, to give the lamb some warm cow's milk. Some of the considerable Norfolk farmers, have, he observes, these huts on four wheels, to draw about with the flock wherever they may be; but to have one littered and well sheltered standing-fold, on a moderate farm, and two or three conveniently placed on a large one, to take the flock to, without any distant driving, is, he supposes, far preferable to that method. And he advises, that upon inclosed farms, where the reserve of roun may be supposed to be much greater than is generally possible on flock-farms, the sheep, as they drop their lambs, should be drawn from the flock of ewes, and put to this food, upon which an entire reliance may be had; and that it should be remembered, that all turnips should be consumed in February, which circumstance proves the vast importance of reserved grafs as a substitute. Towards the close of July the lambs of the flock should be weaned; in this business, it is noticed, that they are much earlier in Suffex, than in Suffol. And that "clover in blossom is, of all other food, the most forcing; faintfoun roun excellent; and if the farmer has neither, he ought to have made a reserve of a sweet good bite of fresh grafs for them;" and that it is essential that due provision should have been made before this period. See SHEEP.

**LAMB-house**, in *Rural Economy*, by the farmer the common name of the place where lambs are fattened. It is sometimes termed fuckle. A proper rack and trough should be fixed up in it. See **LAMB fackling**.

**LAMB-fuckler**, a common name applied to the person who practices or carries on the business of fattening house-lamb. See the next article.

**LAMB-fackling**, a name used to signify the art of fattening house-lamb.

It has been observed by the author of the *Agricultural Report of the County of Middlefex*, that, in the performance of this business, the ewes which begin to lamb about Michaelmas, are kept in the close during the day, and in the house during the night, until they have produced twenty or thirty lambs. These lambs are then put into a lamb-house, which is kept constantly well littered with clean wheat straw; and chalk, previously baked in the oven, both in lump and in powder, is provided for them to lick, in order to prevent looseness, and thereby preserve the lambs in health. As a prevention against gnawing the boards, or eating each other's wool, a little wheat straw is placed, with the ears downwards, in a rack within their reach, with which they amuse themselves, and of which they eat a small quantity. In this house they are kept, with great care and attention, until fit for the butcher. The mothers of the lambs are turned every night, at eight o'clock, into the lamb-house to their offspring. At six o'clock in the morning, these mothers are separated from their lambs, and turned into the pastures; and at eight o'clock such ewes as have lost their own lambs, and those ewes whose lambs are sold, are brought in, and held by the head till the lambs by turn suck them clean: they are then turned into the pasture; and at twelve o'clock the mothers of the lambs are driven from the pasture into the lamb-house for an hour, in the course of which time each lamb is suckled by its mother. At four o'clock all the ewes that have not lambs of their own are again brought to the lamb-house, and held for the lambs to suck; and at eight the mothers of the lambs are brought to them for the night. And where an ewe gives more milk than her lamb will suck, the superabundance is given to the twins, or to any other lamb whose mother may not be able to furnish it with sufficient food. The shepherd must in this case hold the ewe, or she would not suffer the strange lamb to suck. From their timid nature, it is extremely essential

that they should be kept free from every species of unnecessary disturbance. This method of suckling is, it is observed, continued all the year. The breeders select such of the lambs as become fat enough, and of proper age (about eight weeks old) for slaughter, and send them to market during December, and three or four succeeding months, at prices which vary from one guinea to four, and the rest of the year at about two guineas each. This is severe work for the ewes, and some of them die under excess of exhaustion. However, care is taken that they have plenty of food: for, when green food, *viz.* turnips, cole, rye, tares, clover, &c. begins to fail, brewer's grains are given them in troughs, and second-crop hay in racks, as well to support the ewes, as to supply the lambs with plenty of milk; for if that should not be abundant, the lambs would become flunted, in which case no food could afterwards fatten them. It is remarked, that grains were first given to ewes by the late Mr. Naylor, of this county, and that he also was the first person who pulled out all the remaining front teeth of a broken mouthed ewe; observing that they fed much better without teeth than with the loss of one or two.

The ewes for this purpose should be kept free from the foot-rot and scab; and if they have any pitch-mark on them when they lamb, it must be cut off before the lambs be taken into the house, or they will eat it, and thereby greatly prejudice their future growth.

And these ewes are always, the author of the *Middlefex Report* says, without exception, of the Dorsetshire breed; and even of these there is not more than one in three that will lamb sufficiently early for the purpose of house-lamb. The early lambing ewes are sought for by the breeders of this county with great diligence throughout the county of Dorset, and at the fairs where such flock is usually sold. The prices vary from 35s. to 42s.

Such lambs as can be warranted of a fair complexion after being butchered, are held in the highest esteem, which those bought promiscuously in Dorsetshire, or at the fairs, cannot be: this preference induces those breeders and sucklers who are in the secret, to select rams which they can depend on for getting lambs whose meat shall be of that quality. The sucklers, salefmen, and butchers of London, he asserts, are aware that such lambs as have sharp barbs on the inside of their lips are certainly of a deep colour after being butchered; and all those whose barbs are naturally blunt do as certainly produce fair meat. This knowledge has been the occasion of many lambs of the latter kind being kept for rams, and sent into Dorsetshire, expressly for the purpose of improving the colour of the flesh of the house-lambs. The issue of such rams can generally be warranted fair, and such meat always sells at a higher price: hence he supposes arose the mistaken notion, that Middlefex rams were necessary to procure house-lambs. And it has been further observed, that, "in order to conduct this sort of fattening with profit and success, a lamb-house or fuckle of proper dimensions must be provided." And that, "it is found from practice, that a range of building from sixty to seventy feet in length, and fifteen or eighteen in breadth, with three or more coops or divisions of different sizes at each of the ends, for separating the lambs according to their ages, is sufficient for containing and conducting the business of from one hundred and sixty, to one hundred and eighty lambs. That the lambs may be enabled to find their mothers with facility, the ewes, when they are separated from them, should be kept apart with deal hurdles in the middle of the house, so that they may be convenient for the lambs in the coops at the ends.

But this is a practice which can only be undertaken with advantage,

advantage, in situations at no great distance from large towns, where there is great demand for early lamb; as upon their being ready at an early period, as towards the latter end of December, depends the great profit to be derived from the tyllen.

The principal objects in this sort of management are those of attending to the regular feeding of the ewes, the varying of their food with propriety, and keeping the house perfectly warm, clean, and sweet, so that the process of fattening may proceed in a regular manner without any check being sustained.

The writer of the Middlesex Report observes, that a friend of his, who is well acquainted with the subject, says, the farmers of Middlesex do not now rear half so many house-lambs as they did about forty years ago. In Surrey they are likewise falling off. The suckling system is removing to a greater distance from the metropolis, to which place many fat lambs are now sent alive, in light four-wheeled covered carriages.

LAMB, *Grass*, the name of such lamb as is principally fattened while the ewes are at grass, or other kinds of green food. In the Report of Middlesex, it is remarked, that the vicinity of Smithfield market, makes early grass-lambs an object of considerable importance to the farmers of that county. The Dorset ewes are chiefly selected for this purpose. They are purchased at Weyhill, Kinglton, and other fairs, forward enough to drop their lambs in January. The price from 30s. to 35s. The breeders keep the ewes and lambs principally on turnips and second-crop hay. They sell the lambs in the months of April and May, fat, at from 25s. to upwards of 35s. each. The ewes, being dried early, are fattened and brought to market about Michaelmas, and sold at the same prices. The wool is about three pounds, which, at 10*s.* amounts to 2*s.* 6*d.* The whole of the flock is cleared within the year, and the profit or loss thereby ascertained. The account in general is as follows:

Statement.			
The lamb sells for	-	-	1 10 0
The ewe for	-	-	1 10 0
The wool at 2 <i>s.</i> 6 <i>d.</i> or	-	-	0 2 0
Together			3 2 0
Deduct prime cost			1 12 0
Remains the increase of a ewe in one year			1 10 0

LAMB, *House*, a term applied to that sort of lamb that is fed and fattened in houses constructed for the purpose. The principal art in this business, as has been seen above, is to have the lambs such as will turn out of a fair delicate colour on being killed, and having them ready at an early period of the season. See LAMB-SUCKLING.

LAMB-*Earth*, in *Husbandry*, is a whitish stony loam. The name seems only a corruption of the word *loam-earth*.

LAMB *Head*, in *Geography*, a cape of Ireland, forming the northern point of the entrance to Kenmare river, in the county of Kerry. N. lat. 51 41'. W. long. 10° 1'.

LAMB *Head*, a cape on the S.E. coast of the island of Stronfa, one of the Orkneys. N. lat. 58° 57'. W. long. 2° 25'.

LAMB *Island*, a small island of Scotland, in the mouth of the Forth; one mile N.N.W. from North Berwick.

LAMB'S *Lectuce*, in *Gardening*, the common name of an early, well-known, herbaceous plant. See VALESIANA.

LAMB, *Paschal*. See PASCUAL.

LAMBA, in *Geography*, one of the smaller Shetland islands, between Shetland and Yelle. N. lat. 60 45. W. long. 1° 39'.

LAMBALE, a town of Africa, in the country of the Foulis, on the Senegal; 75 miles S.E. of Goomal.

LAMBALLE, a town of France, in the department of the Northern Coasts, and chief place of a canton, in the district of St. Brienc. The place contains 3803, and the canton 12,685 inhabitants, on a territory of 225 kilometres, in 14 communes.

LAMBAN, a town of Asia, in the country of Guriel, on the Black Sea; 50 miles S.W. of Cotatis.

LAMBANESS, a cape on the N.E. coast of the island of Unli. N. lat. 61 10. E. long 1 4'.

LAMBANLAOTE, a small island on the east side of the gulf of Bothnia. N. lat. 61° 39'. E. long. 21 15'.

LAMBASSA, in *Ancient Geography*, a town of Africa, in Numidia, which became an episcopal see.

LAMBATIVES, or rather LAMBITIVES, in the *Materia Medica*, a form of medicine to be licked off the end of a liquorice-stick.

Lambatives amount to the same with *linzuses, lobocks, and cecemata*.

LAMBAY, in *Geography*, an island belonging to the county of Dublin, Ireland, situated in the Irish sea; 2 miles east from the Mainland. It is about three miles in length, and 14 mile in breadth, and is remarkable for vast quantities of rabbits and sea-fowl. Crabs, lobsters, and oysters are taken in great plenty; and abundance of kelp is made on it. N. lat. 53° 30'. W. long. 6. Carliste, &c.

LAMBAYQUE, a town of the vice-royalty of Peru, and capital of the jurisdiction of Sana. in the diocese of Truxillo, in a pleasant and fertile situation, and containing about 1500 houses, some of which are built of brick, some of cane and plaiter, and others altogether of cane. The inhabitants amount to about 8000; some are opulent; but the greater number consists of poor Spaniards, Mulattoes, Mestizos, and Indians. The parish church, constructed of stone, is large and beautiful, and splendidly adorned. It has four chapels, called "Ramos," with an equal number of priests. This town is the residence of a corregidor, who has many other towns under his jurisdiction. It is washed by a river of the same name, 95 miles W.N.W. of Truxillo. The high road from Piura to Lima passes through this town. Some wine is made in the vicinity, and the poor are occupied in weaving coarse cotton cloths. S. lat. 6 40'. W. long. 79° 56'.

LAMBDOIDES, in *Anatomy*, the future connecting the occipital to the two parietal bones, and so named because it consists of two lateral divergent branches like those which compose the Greek capital lambda. See CRANIUM.

LAMBECIUS, PETER, in *Biography*, was born at Hanburgh in 1628, where he received the early part of his education, and from whence he proceeded to the universities of Holland and France to pursue and complete his studies. He made great progress in polite literature and the law, and at the age of nineteen he became known by a work on Aulus Gellius. He was elected licentiate-in-law at Toulouse; he spent two years at Rome with cardinal Barberini; and on his return to Hanburgh he was appointed to the professorship of history in 1652; and in 1660 was made rector of the college in that city. He was rendered extremely uneasy by being charged with scepticism, and by the temper of his wife, whom he had married probably because she was rich, but who refused to let him share in her abundance. In 1662, he therefore abandoned his family and country, and went first to Vienna, and from thence to Rome, where he

was favourably received by Christina, queen of Sweden, and pope Alexander VII. He now openly abjured Lutheranism, and declared himself a Catholic, to which religion he had been converted many years before. Returning to Vienna, he was appointed sub-librarian, and then librarian-in-chief to the emperor, in which post he died in 1680. Lambæcius was author of many works, as "Origines Hambergensis," in 4to.; "Codmæ et alterius anonymi excerpta de Antiquitatibus Constantinopol." Greek, with a Latin version and remarks, fol. 1655; "Prodrus Historiæ Litterariæ," fol.; "A Collection of Latin Discourses on various Occasions," 4to. 1666; but the most laborious of his performances was entitled "Commentariorum de Augusta Bibliotheca Cæsaria Vindobonensi," in eight volumes, folio. This work contains a history of the imperial library at Vienna, with a descriptive catalogue of its numerous MSS. upon a critical and historical plan. Moreri. Bayle.

LAMBERT FIRE. See FIRE.

LAMBERT, ANNA-TERESA DE MARGUESOT DE COCKELLES, *Marchioness of*, in *Biography*, a celebrated literary lady, was born at Paris in 1647. Her father died while she was an infant, and her mother took for a second husband M. Bachaumont, who was exceedingly careful to cultivate the promising talents of his daughter-in-law. She married Henry Lambert, marquis of St. Brie, in 1666, who died in 1686, leaving her with one son, and a daughter. She was involved in tedious law-suits, which, by her great address, were brought to a happy conclusion. When she felt herself unembarrassed, and mistress of a considerable estate, she fixed her residence at Paris, and devoted herself to letters, and the society which cultivated them. The latter days of this lady were crowded with sufferings, which the consolations of religion enabled her to endure with fortitude. She died at a very advanced age in 1733. Her principal works are "Les Avis d'une Mère à son Fils; et d'une Mère à sa Fille;" "Nouvelles Reflexions sur les Femmes, ou Métaphysique d'Amour;" "Traité de l'Amitié." Of these, and of her other works, the style is elegant, and the thoughts ingenious. The "Advice" to her children breathes all the tenderness of a parent, joined to the correctness of sentiment of a philosophical moralist. The heart of Madame de Lambert was as warm as her understanding was enlarged; she served her friends with zeal, and delighted in acts of generosity.

LAMBERT, FRANCIS, a French monk, who quitted his convent to embrace the reformed religion, descended from a noble family, was born at Avignon in the year 1487. At the age of fifteen he entered himself among the Franciscan friars, and continued in the community twenty years; during which time he acquired celebrity as a preacher, and was made general of the order. He was a thoughtful man, and a diligent enquirer after the truth; and in the course of his investigations he saw reason to renounce the doctrines of the Catholic church, and to adopt those of the Reformation. He, of course, found it necessary to withdraw from his native country, and in 1522 he went into Switzerland. He became a popular preacher among the Protestants, and having continued some time at Basil, he set out for Wittemberg to visit Luther, in the year 1523. With that eminent reformer he grew into high esteem, and it was determined he should go to Zurich, to assist in disseminating the principles of the reformation through France. The project was abandoned, and he was settled in some employment in the university of Wittemberg, where he most probably continued till the year 1526. In the following year he was appointed divinity-professor at the university of Marburg, and in 1530

he died at the age of forty-three. He was author of commentaries on almost all the parts of the Old and New Testament, and of many theological and controversial pieces. Bayle. Moreri.

LAMBERT, JOHN HENRY, an eminent mathematician and astronomer, was born at Muhlhausen, in the Sundgaw, a town in alliance with the Swiss cantons, Aug. 29th, 1728. His father was by trade a stay-maker, and with difficulty provided for the wants of his family. Having no better prospects for his son than by bringing him up to his own business, he endeavoured to obtain for him an education suitable to his situation, and sent him to a public school, where he was taught the rudiments of learning, at the expense of the corporation, till he was twelve years old. Here he distinguished himself among his school-fellows, and some attempts were made to provide him with the means of studying theology as a profession. Encouragement sufficient for the purpose could not be obtained, and he was under the necessity of relinquishing all thoughts of a studious life, and obliged to begin learning his father's trade. Though occupied all the day, yet he devoted a considerable part of the night to the prosecution of his studies; and to furnish himself with candles, he sold for half-pence or farthings small drawings which he delineated while employed in rocking his infant sister in a cradle. He met with an old book on the mathematics which gave him inexpressible pleasure, and which proved that he had a genius for scientific pursuits. Seeing the turn which the young man had for knowledge, several learned men afforded him assistance and advice, and they had the pleasure of finding him improve, under their patronage, with a rapidity beyond their most sanguine expectations. He was now taken from the drudgery of the shop-board, and M. Iselin, of Basil, engaged him as his amanuensis, a situation which afforded him an opportunity of making further progress in the belles-lettres, as well as philosophy and mathematics. In 1748, his patron recommended him to baron Salis, president of the Swiss confederacy, to become tutor to his children, in which office he gladly engaged. His talents as a philosopher and mechanic began to display themselves in his inventions and compositions. After living eight years at Coire, he repaired, in 1756, with his pupils, to the university of Göttingen, where he was nominated a corresponding member of the Scientific Society in that place, and from thence he removed, in the following year, to Utrecht, where he continued twelve months. In 1758, he went with his pupils to Paris, where he acquired the esteem and friendship of D'Alembert and Messier; and from thence he travelled to Marcellis, where he formed the plan of his work "On Perspective," which he published in the following year at Zurich. In 1760, he published his "Photometry," and was elected a member of the Electoral Bavarian Scientific Society. Lambert was author of many other pieces besides those which have been already mentioned: among these were his "Letters on the Construction of the Universe," which were afterwards digested, translated, and published under the title of "The System of the World." In the year 1764, he made an excursion to Berlin, where he was introduced to Frederick II., who, sensible of his great services to science, gave directions to have him admitted a regular member of the academy; this appointment enabled him to devote himself wholly to the pursuit of his favourite studies. He enriched the transactions of several learned societies with his papers and treatises, some of which he published separately. He died Sept. 25th, 1777, when he was in the 50th year of his age. Most of his mathematical pieces were published in a collective form by himself in three volumes, in which almost every branch

of mathematical science has been enriched with additions and improvements. Eulogy prefixed to "The System of the World." London, 1800.

LAMBERT, JOHN, a distinguished general on the side of parliament during the civil wars of Charles I., was defended of a good family, and was, at the commencement of the troubles, a student of law. He had a superior command at the famous battle of Naseby, and on account of his skill and prowess he became a favourite of the independent party, who endeavoured to obtain for him the lieutenancy of Ireland, but the Presbyterians carried it against him in favour of Waller. He was confined in by Cromwell, to whom he was considered as second in rigour and military talents, and whom, it is said, he equalled in ambition. He opposed the project of making Cromwell king, though he had a great hand in placing him protector at the head of the state. He fell into disgrace, and retired with a pension to Wimbledon, where he employed himself in cultivating his garden; but upon the death of the protector he returned to public life, and was extremely useful to the party of Richard. Monk was the great rival of Lambert, and as the former was successful, the latter was not only humbled, but made prisoner and committed to the Tower. At the restoration, he and Sir Henry Vane were excepted from the act of indemnity: he was brought to trial and condemned, but by humble submission he was relieved at the bar. He was banished to Guernsey, where he survived forty years. Hume.

LAMBERT, GEORGE, was among the first English artists who obtained celebrity upon the revival, (if it may be so called), of painting in this country; which now stands so justly exalted in arts as well as arms, among the nations of Europe.

Lambert's taste led him to admire and to imitate the style of Gaspar Poussin in landscape; and he has produced several works of considerable merit; which, if they have not the brilliancy and force of Gaspar, are rich, and abound with beauties of a gentler kind. He also painted scenes from common nature, and at the Foundling hospital may be seen one he presented to that institution, which is deserving of very great praise. He was engaged to paint scenes for the play-houses, for which his pencil was peculiarly qualified, and, in concert with Scott, painted six large pictures of their settlements for the East India Company, which are placed at their house in Leadenhall-street. He died in 1765.

LAMBERT, MICHEL, was the favourite singing maller, and composer of songs in France, about the middle of the seventeenth century. He had for many scholars, that he was obliged to teach a considerable number at a time, and at his own house, where he formed a kind of academy, and where he finished every lesson with singing, to his own accompaniment, several songs to a brilliant and enraptured audience. Marcel, the celebrated dancing-maller, did the same, dancing with his best scholars at the end of the lessons which he gave at home on his public days. The reputation of Lambert, like that of Abelard, was so great, that his pupils followed him into the country as far as Puteaux, where he had a villa. Lulli married the daughter of this musician, who was born in 1610, and died in 1669.

LAMBERT, ABBÉ DE ST. BERTIN, in 1095 taught grammar, dialectics, theology, and music.

These sciences, at that time, were equally respected, music having no other object than the praises of the divinity.

LAMBERT, DE, SAINT, published, in 1702, "Les Principes du Clavecin," or Instructions for the Harpsichord, containing a clear explanation of all that concerns the clavier, or keys, in their rotation on that instrument; and "A Treatise of Accompaniment," for many instruments. St. Lambert,

in his instructions for the harpsichord, proposes the reducing all clefs to one, in order that the two hands should play from the same clef. Montclair has new-modelled this system, to adapt it to the five lines, or flaff, and general compass of the voice; and the abbé de la Cassagne, in his Elements of Singing, has adopted this system and extended it. The basis of which being nothing more than transposition, it is now become wholly useless, by the clear and simple manner in which music is taught, that is, without transposition, and by playing every thing just as it is written. Thus M. Laborde's account of these publications, in which he seems not to know, that the plan of abolishing all clefs but one, belongs not to any of the gentlemen who have published it in France, but to our countryman Salmon, who, in the time of Charles II. published "An Essay to the Advancement of Music, by casting away the Perplexity of different Clefs, &c." and when M. Laborde says, that such a reformation is not wanted, because music is now taught in so clear and simple a manner, as to render all clefs but the treble and base used in harpsichord pieces unnecessary; that intelligent author forgets to tell us how performers on keyed instruments are to be enabled to play, from the score of a chorus for voices and instruments, in which the vocal-parts and many of the instrumental are all written in different clefs. But for a further discussion of this subject, see the article CLEF.

LAMBERT, in *Geography*, a town of Canada, on the river St. Lawrence. N. lat. 45° 34'. W. long. 73 14'.

LAMBERT Bay, a bay on the N.E. coast of the island of St. Christopher; two miles S.W. of Maddy Point.

LAMBERT'S Point, a cape of the island of Barbadoes, on the W.S.W. coast.

LAMBERT'S Blaz. See AZURE, and BLUE ultramarine.

LAMBERTIA, in *Botany*, received its name from the writer of the present article, in honour of his highly valued friend Aylmer Bourke Lambert, esq. F.R.S. and F.A.S. a vice-president of the Linnæan Society, one of the most ardent and experienced botanists of the present age, whose ample herbarium and library are ever open to the cultivators of his favourite science, as his heart is to the best feelings of friendship.—His botanical treatise on *Cinchona*, his sumptuous work on the Fir tribe, and his various essays in the Transactions of the Linnæan Society, are amply sufficient to assert his claim to the honour in question.—Sm. Tr. of Linn. Soc. v. 4 214. t. 20. Cavan. Ic. v. 6. 31. Brown Tr. of Linn. Soc. v. 10. 187. Prodr. Nov. Holl. v. 1 386. Art. Hort. Kew. ed. 2. v. 1. 241.—Class and order, *Tetrandra Monogynia*. Nat. Ord. *Aggregata*, Linn. *Protea*, Juss.

Gen. Ch. *Cal.* Involucrum of many oblong, imbricated, coloured leaves, the inner ones gradually the largest, containing from one to seven flowers, deciduous. Perianth none. *Cor.* Petals four, coloring at the base, linear-lanceolate, equal, revolute from above their point of union bearing the stamens. Nectary of four glandular scales at the base of the germen, sometimes united. *Stam.* Filaments none; anthers four, sessile at the inner side of the revolute-part of each petal, linear, at length recurved. *Pist.* Germen superior, turbinate, fringed at the top; style thread-shaped; stigma rather thicker, prominent, awl-shaped, furrowed. *Peric.* Follicle roundish-wedge-shaped, somewhat woody, more or less horned or tubercular, of one cell. *Seeds* two, orbicular, compressed, each encompassed with a rounded wing. *Common receptacle* flat, without scales.

Ess. Ch. Petals four, coloring, spirally revolute, bearing the stamens. Nectary of four scales. Stigma awl-shaped. Follicle woody. Seeds two, bordered. Involu-

erum of many leaves, imbricated, coloured, deciduous. Receptacle flat.

Obs. We have borrowed several corrections of the original characters of this genus, from the able performance of our friend Mr. R. Brown, published in the Transactions of the Linnean Society, v. 10, illustrative of this whole natural order of *Proteaceæ*. If we differ from him in terming *corolla* what he calls *calyx*, it is a matter of opinion, attended with much doubt. The late Mr. Dryander, however, agreed in this point with us.

One species of *Lambertia* only was originally known, the *formosa*, to which Mr. Brown adds three others. We shall give them in the order he has chosen. He remarks, that "they are all very beautiful shrubs, with whorled branches. The leaves are three in a whorl, mostly undivided, entire. Involucrum terminal, solitary, coloured, mostly seven-flowered, rarely single-flowered; in the former case the flowers are ranged in two whorls, corresponding with the disposition of the foliage, and having an odd terminal one; hence it is probable some species with four flowers only may exist. The foliole is almost wedge-shaped, furnished at the edges, upwards, with points, sometimes elongated into horns, and sometimes the sides are armed with prominences."

1. *L. uniflora*. Brown Tr. of Linn. Soc. v. 10. 158.—"Flowers solitary in each involucre. Leaves obovate, with a point, smooth, reticulated. Follicle pointed at one side, without horns."—Gathered by Mr. Brown in Lewin's Land, on the fourth coast of New Holland, growing about rocky inlets, near the shore.

2. *L. inermis*. Ibid.—"Flowers seven in each involucre; twice as long as its inner leaves. Style smooth. Follicles pointed at one side, without horns. Leaves oblanceolate or obovate, pointless."—Native of the stony sides of hills in Lewin's Land.—*L. formosa*, var. *longifolia*, Andr. Repert. t. 69, agrees in most respects with this, though not cited by Mr. Brown's *Prodromus*, where he has omitted it as a synonym of true *formosa*. The fruit drawn in this plate may belong to the latter. The involucre is represented green.

3. *L. formosa*. Sm. Tr. of Linn. Soc. v. 4. 223. t. 20. Cavan. Ic. v. 6. 32. t. 547. (*Protea nectarina*; Wendl. Sert. Hannov. fasc. 4. 5. t. 21.)—"Flowers seven in each involucre; the length of its inner leaves. Style hairy. Follicle pointed at one side, two-horned at the other. Leaves linear-lanceolate, sharp-pointed, recurved at the edges."—Native of stony heaths near Port Jackson, New South Wales, from whence we received specimens among the first that were sent to Europe by Dr. John White. The leaves are green and smooth above; white, and reticulated with veins, beneath. Involucre and flowers of a fine rose-colour or crimson.

4. *L. echinata*. Brown n. 4.—"Leaves linear, smooth, reticulated; dilated, lobed and pointed at their extremities. Follicles two-horned, thorny all over."—Native of the stony sides of hills in Lewin's Land, where Mr. Brown gathered it in fruit, but never saw the flowers. Hence its genus remains doubtful, especially, as that intelligent writer observes, on account of the leaves being lobed, which is contrary to the nature of the other species.

LAMBESA, or LAMBESSE, in *Ancient Geography*, (*Tex-zoute*), a town of Mauritania Sitifensis, situated on mount Audus. It was the most considerable town of the country, and the third legion of Augustus was quartered in it. Its ruins and inscriptions are still noticed.

LAMBESC, in *Geography*, a town of France, in the department of the mouths of the Rhone, and chief place

of a canton, in the district of Aix; 12 miles N.W. of Aix. The place contains 4000, and the canton 10,530 inhabitants, on a territory of 257½ kilometres, in 7 communes.

LAMBESSE, a town of Algiers, in which are magnificent ruins of an amphitheatre, a temple of Efculapius, &c.; 45 miles S. of Constantine. See LAMBESA.

LAMBETH, an extensive parish, seated on the fourth bank of the river Thames, in the hundred of Brixton, and county of Surrey, England. It is directly opposite to Westminster, to which city it is connected by a handsome stone bridge across the river. The whole is bounded by Southwark to the east, Newington Butts and Camberwell to the south, and Battersea to the west. The circumference is about 16 miles. In Domesday-book, it is said to contain 20½ plough-lands. At the beginning of the seventeenth century, it appears, by the churchwardens accounts, to have consisted of 1262 acres of arable land, 1026 of pasture, 125 of meadow, 13 of ozier, 27 of garden ground, and 150 of wood, making in the whole 2603; the commons and waste land, supposed to be about 330 acres, not being charged, will increase it to 2933 acres. At present, the whole extent is about 4000 acres; of which about 1390 are occupied by houses and other buildings, wharfs, manufactories, streets, and roads; 415 by pleasure gardens, including those of Vauxhall; 80 by market gardens; 300 by farming gardens; 40 by nurseries; 250 are now inclosing from common; and 30 are to remain common. The parish is divided into six liberties or precincts, respectively called the Bishop's, the Prince's, Vauxhall, Marsh and Wall, Lambeth-Dean, and Stockwell; the whole containing, according to the return to parliament in the year 1800, 5009 houses, and 27,085 inhabitants, of whom 5148 were stated to be employed in various trades and manufactures, and 955 in agriculture. Archbishop Hubert Walter obtained from king John a grant of a weekly market, and a fair of fifteen days, upon condition that the same should not be detrimental to the interests of the city of London. In the archbishop's MS. library, is a charter from the city, signifying their consent, stipulating only, that the fair should begin on the morrow after the anniversary of St. Peter ad vincula. The market and fair are both discontinued. The earliest historical fact on record relating to Lambeth, is the death of Hardicanute, which happened here in the year 1041, while he was celebrating the marriage feast of a noble Dane. Here also, Harold, who usurped the throne on the death of Edward the Confessor, is said to have placed the crown on his head with his own hands. Henry III. held a solemn Christmas here in the year 1231; and a parliament on September 14, in the year following. A most violent outrage was committed in Lambeth church, on Sunday February 19, 1642-3. The story is variously told by the different parties; but it stands on record as an instance of the fatal effects of civil discord, from the outrages of which no place, however sacred, is exempt.

Of the archbishop's palace, the chief object of note in the parish, it will be proper to state a few particulars. It is situated near the river; and is certainly a very large pile of building, exhibiting the architectural styles of various ages. It appears that this palace was, in a great measure, if not wholly, rebuilt by archbishop Boniface in the year 1262. If any part of this structure now remains, it is the chapel; the architecture of which might induce one to ascribe it to a more early period. Under the chapel is a crypt, the arches of which are built with stone, as is the chapel; the roof of the latter is of wood and flat; the windows were formerly of painted glass, put up by cardinal Morton. In the chapel were interred the remains of archbishop Parker. The great hall

hall was rebuilt by archbishop Juxton, after the civil wars, at an expence of 10,500*l.* It is 93 feet long by 38 wide; and has a fine carved wooden roof. The guard room, built before the year 1428, has a roof similar to that of the hall. Cardinal Pole is said to have erected the long gallery, which measures 90 feet by 16. In this room are several portraits of archbishops, and other illustrious characters. In the great dining-room, 38 feet by 19, are also portraits of all the archbishops from Laud to the present time; this series is particularly interesting, as, among other things, they shew the gradual change of the clerical dress. Archbishop Tillotson was the first to wear a wig; which however resembled the natural hair, and was worn without powder. A noble library occupies four galleries, over a small quadrangular cloister. The first collection of books was bequeathed by archbishop Bancroft; but these were seized in the civil wars, and though much injured, and some lost, yet the chief stock was restored by archbishop Juxton, after the restoration. Archbishops Sheldon, Tenison, and Secker augmented the library; and the number of books is now supposed to be, at least, 25,000 volumes. In the windows is some fine painted glass. (See Brayley and Herbert's Illustrations of Lambeth Palace, 4to. 1806, for various views of this palace, and portraits, &c. from the painted glass.) The MS. library contains a large and valuable collection of records and MSS. At the west end of the chapel is a lofty building, called Lollards' tower, built by archbishop Chichele in the years 1434 and 1435. At the top is a small room called the prison, in which it is said the Lollards were confined. The gateway, and the adjoining tower, which are of brick, were built by archbishop Morton about the year 1490. The gardens and park, which contain nearly thirteen acres, are laid out with great taste; they were much improved by the late archbishop, who made a convenient access to the house, for carriages, through the park. It has been said, but erroneously, that Stephen Langton is the first archbishop upon record who resided at Lambeth. Hubert Walter was there in 1198; and many of the public acts of the metropolitan were performed at Lambeth prior to that period.

Contiguous to the palace is the parish church, which was rebuilt between the years 1374 and 1377. The tower, which is of free-stone, still remains; the other parts of the present structure appear to be about the age of Henry VII. The church now consists of a nave, two aisles, and a chancel. Two chapels, called Howard's and Leigh's, were built in 1522; they were incorporated with the church when it was repaired in 1769. Among the numerous sepulchral memorials in this church, those most worthy notice are for the archbishops Tenison, Hutton, and Cornwallis, and a marble slab to the memory of the celebrated antiquary Elias Ashmole.

In this parish are situated the Asylum, instituted in 1758, for the reception of female orphans; and the Westminster Lying-in-Hospital, built in 1765.

About the end of the seventeenth century, a manufacture of plate glass was established at Vauxhall, in this parish, under the patronage of the duke of Buckingham; the principal artist was Rossetti. It was carried on with great success, and the glass was thought to excel that made at Venice. (See GLASS and LOOKING-GLASS.) The importation of foreign timber, which for many years has formed a considerable and important branch of our commerce, has been a source of wealth to this parish, where are several wharfs for that trade, supplied with stores which are almost incredible. At Vauxhall are some very large distilleries, and several potteries; the manufacture of stone earthenware pots is said to have been first introduced here from

Holland. On the site of Cuper's gardens (formerly a place of public entertainment,) are Messrs. Brauhy's extensive vinegar works. Mr. Pennant, who went over the premises, mentions a vessel full of sweet wine, containing 58,109 gallons, and another full of vinegar, containing 56,799 gallons; besides these enormous vessels there are several others which contain from 32,500 to 16,974 gallons each. In the year 1766, Mrs. Coade established in this parish, near Westminster bridge, a manufacture of artificial stone, which is cast in moulds and burnt. It is intended to answer the purpose of stone, for every species of ornamental architecture, at a much cheaper rate than carving. Where it has been placed in exposed situations it has been found to endure the frost. Messrs. Watts have lately established a manufacture of porcelain in this parish: the principle of making this sort is, to let it fall from a great height into the water, that it may cool and harden in its passage through the air, and thereby better retain its spherical shape. The height of the tower at this manufactory is about 140 feet; the shot falls 123 feet six inches. About the same time Messrs. Bolton, Morgan, and Co. established a manufactory here under the title of the woollen yarn company; every branch of the clothing manufacture, from sorting the wool to making the cloth, was carried on entirely by machinery; but the undertaking was soon given up. About a century ago, there was a place of entertainment called Lambeth Wells, situated in what is now called Lambeth Walk. A riding-school, for the exhibition of feats of horsemanship, was opened in this parish about the year 1768, by Mr. Philip Alley. At first it was an open area; in 1780 it was converted into a covered amphitheatre, and divided into boxes, pit, and gallery. Spring Gardens, Vauxhall, (which is mentioned in the Spectator as a place of great resort,) is open during the great part of the summer, being illuminated with a great number of lamps; the entertainment consists of a concert of music performed, in fine weather, in the open air; the price of admission, till 1796, was one shilling; it is now three shillings and open three times each week during the summer months. Lysons's Environs of London, vol. i. 4to.

LAMBIN, DENNIS, in *Biography*, an eminent critic was born at Mostreuil-sur-Mer in the year 1516. He appointed professor of the belles lettres at Amiens; and this he resided long in Italy with cardinal de Tournon, on his return to Paris obtained the Greek professorship of the royal college. He acquired a great reputation as the learned by his commentaries on Lucretius, Cicero, Virgil, and Horace. He translated from Greek into the language, the Ethics and Politics of Aristotle, and the orations of Demosthenes and Æschines. He died in the occasion of his death was the great shock which he received from the news of the murder of his friend Raimond, the massacre of St. Bartholomew. He was a man of found erudition and great industry. Moreri.

LAMBOURNE, or LAMBORN, in *Geography*, an ancient market town of Berkshire, England, is about 15 N.E. of Hungerford, and 65 W. of London. A fair was established here at a very remote period; an charter of 1227, it is called Chompe-Lanbourn, a fair was granted to the family of Fitzwarren. In the reign of Henry VI. the charter was renewed, and tw additional fairs granted in favour of the dean and chapter of Paul's, London. The market is much declined; here are still held three fairs annually. In the market place is a stone cross of a tall, plain shaft, on steps. The parish is co-extensive with the hundred to which it gives name. In the year 1800, the population of the town, with its dependent hamlets, was 2045. The parish church is spacious and

and handsome building, in the form of a cross; on its southern side are two chanting-chapels, one of which was founded by John Ellbury, who died in 1372, and the other by his descendant of the same name, who died in 1485. Near the church is an almshouse, or hospital, founded by John Ellbury, for ten poor men. In the north transept of the church is a monument for Sir Thomas Effex, who died in 1558, with effigies of himself and his lady, in alabaster. Lyons's Magna Britannia, vol. i.

**LAMBRA**, a town of European Turkey, in Livadia; 14 miles S.S.E. of Athens.

**LAMBSDORFF**, a town of Silesia, in the principality of Neisse; 9 miles N.E. of Neisse.

**LAMCAL**, a town of Pegu, on an island in the Ava; 56 miles N.E. of Peraiam.

**LAME**, in the *Manege*, is used in several phrases of that art; as *lame of an ear*, called in French *boiteux de oreille*, is said of a horse, when he halts upon a walk or trot, and keeps time to his halting with the motions of his head; for all lame horses do not keep time in that manner. See **HALTING**.

**LAME** of the *bridle*, is used by way of raillery, to signify the same thing.

**LAMECH**, in *Scripture Biography*, the son of Methuselah, of the race of Cain, the fifth in descent from him, and the father of Jabel, Jubal, Tubalcaim, and Naamah. He married two wives, Adah and Zillah, and is supposed to have introduced polygamy. To his wives he said, "Hear my voice, ye wives of Lamech: for I have slain a man to my wounding, and a young man to my hurt: if Cain shall be avenged seven-fold, surely Lamech seventy and seven-fold." (Gen. iv. 24, 25.) These words have perplexed Biblical critics. Some interpretations have been given of this passage which must be considered as founded on mere fables, and they are not worthy of recital. Onkelos, who wrote the first Chaldee paraphrase on the Pentateuch, reads the words with an interrogation: "Have I slain a man to my wounding, and a young man to my hurt?" and accordingly he paraphrases it thus: "I have not killed a man, that I should bear the sin of it; nor have I destroyed a young man, that my offspring should be cut off for it." Dr. Shuckford has improved this interpretation, by supposing that Lamech was endeavouring to reason his wives and family out of their fear of having the death of Abel revenged upon them, who were of the posterity of Cain. As if he had said, "what have we done, that we should be afraid? We have not killed a man, nor sinned any injury to our brethren of any other family; and God would not allow Cain to be killed, who had murdered his brother, but threatened to take seven-fold vengeance on a man that should kill him; doubtless they must expect much greater punishment, who should presume to kill any of us. Therefore we may surely look upon ourselves as safe under protection of the law and of the providence of God."

**LAMECH** was also the son of Methuselah, and father of Noah; at whose birth he was 182 years of age; and he after it 595 years, so that his whole life was 777 years; born A.M. 874, and dying 1651. See **ANTE-DILU-**

**MEGAL**, in *Geography*, a town of Portugal, in the Prince of Beira; 9 miles N.W. of Pinhel.

**MEGO**, a city of Portugal, in the province of Beira, the see of a bishop, suffragan of Braga; situated on a plain near the Duero, and surrounded with mountains. It contains two cathedral churches, an hospital, four convents, and about 4500 inhabitants. The adjacent country pro-

duces excellent wines; 36 miles E. of Porto. N. lat. 41° 7'. W. long. 7° 27'.

**LAMELAN**, an island in the Baltic, near the S.E. coast of the island of Aland; eight miles long and four wide. N. lat. 60° 5'. E. long. 37° 45'.

**LAMELLEÆ**, derived of *lamina*, and signifying as much as *little laminae*; little, thin plates, or laminae; whereof the scales and shells of fishes, &c. are composed.

**LAMELLÆ**, in *Botany*, the gills, or thin vertical plates which compose the *hymenium*, or fructifying membrane of that great genus of fungi called *Agaricus*, to which the common eatable mushroom belongs. (See **HYMENTUM** and **AGARIC**.) Schaeffer and Hedwig have found the seeds to be lodged copiously in the substance of these plates.

**LAMENESS**, **CLAUDICATIO**, in *Surgery*, Lameness arises from a variety of causes. From native deformity, or from the thigh being put out of joint in the birth; from the bad conformation of the cotyloid cavity of the ossa innominata; from the weakness of the hips; from external accidents; and from diseases. See **LEG** and **LUXATION**.

**LAMENTATIONE**, *Ital.* applied to a musical movement, requires that it should be sung or played in a plaintive and mournful manner.

**LAMENTATIONI**, in the plural, implies complaints and lamentations. Between the time of the reformation and Charles I., there was a kind of maudlin piety, which had seized Christians of all denominations. Among Calvinists, it exhorted itself in psalmody, and in others in lamentations. The Scots, among their old pathetic airs, have many laments. The Italians sung them in Latin, like the Salmi penitential; and in their own language. The sixteenth century was very prolific in lamentation. But in England even the lute was to weep, and be sorrowful: for Dowland, the famous lutenist, published *Lachrimæ*, or "seven tears, figured in seven passionate Pavins." The poetry of these whimpering seems much inferior to that of Sternhold and Hopkins. However, the best English composers of the times thought them worthy of the best music which they could set to them, in four and five parts. Sir William Leighton, knight, who set many of them himself, was the editor of a collection of lamentations to four and five voices, with an accompaniment for the lute; and in the list of the composers we have Bird, Dr. Bull, Orlando Gibbons, Dowland, Robert Jhonson, Forde, Hooper, Kindersley, Nat. Gyles, Coppario, Pilkington, Luffo, Peirson, Jones, Alfonso Ferrabosco, Ward, Weekes, Wilbye, and Milton, the father of the great poet.

**LAMENTATIONS**, a canonical book of the Old Testament, written by the prophet Jeremiah, according to archbishop Usher and some other learned men who follow the opinion of Josephus and St. Jerom, on occasion of Josiah's death. But this opinion does not seem to agree with the subject of the book, the lamentation composed by Jeremiah on that occasion being probably lost. Some have supposed that the fifty-second chapter of the book of Jeremiah was probably added by Ezra, as a preface or introduction to the Lamentations.

The learned bishop Lowth, in his admirable book entitled "*Prælectiones de Sacra Poëti Hæbræorum*," has treated at large of this elegiac poem; illustrating its general nature and form, its metre or versification, and its subject, sentiments, and imagery. The Lamentations, he says, consist of a number of plaintive effusions, composed upon the plan of the funeral dirges, all upon the same subject, and uttered without connection as they rose in the mind, in a long course of separate litanies. These were afterwards put together, and formed into a collection, or correspondent whole. In the character

character of a mourner he celebrates, in plaintive strains, the obsequies of his ruined country; whatever pretended itself to his mind in the midst of desolation and misery, whatever struck him as particularly wretched and calamitous, whatever the instant sentiment of sorrow dictated, he pours forth in a kind of spontaneous effusion. He frequently pauses, and, as it were, ruminates upon the same object; frequently varies and illustrates the same thought with different imagery, and a different choice of language: so that the whole bears rather the appearance of an accumulation of corresponding sentiments, than an accurate and connected series of different ideas, arranged in the form of a regular treatise. The nature and design of the poem neither required nor admitted of a methodical arrangement. The whole poem, however, may be divided, according to our author, into five parts; in the first, second, and fourth, the prophet addresses the people in his own person, or else personifies Jerusalem, and introduces that city as a character: the third part is supposed to be uttered by the chorus of Jews, represented by their leader, after the manner of the Greek tragedies; and in the fifth, the whole nation of the Jews, on being led into captivity, pour forth their united complaints to Almighty God. This last, as well as the other, is divided into twenty-two periods, according to the number of the letters of the alphabet with this difference, that in the four other parts the initial letters of each period exactly correspond with the alphabetical order. The form of composition employed in this poem is a specimen of the acrotic or alphabetical poetry of the Hebrew: and the manner and order of this kind of verse are as follow: Each of the five parts, or grand divisions, is subdivided into 22 periods, or stanzas; these periods in the three first parts are all of them triplets, or they consist each of three lines, only in each of the two former parts. There is one period consisting of four lines. In the four first parts, the initial letter of each period follows the order of the alphabet; but the third part is so very regular, that every line in the same period begins with the same letter, so as necessarily to ascertain the length of every verse or line in that poem: and though the lines are not thus distinctly marked in the other parts, their limits may be ascertained by resolving the sentences into their constituent members. By this method of computation it appears, that in the fourth part all the periods consist of distichs, as also in the fifth, which is not acrotic; but in this last the lines are extremely short, whereas in all the rest they are long. In this poem there are lines and verses which are longer by almost one-half than those which occur usually, and on other occasions. The length of them seems, on an average, to be about twelve syllables: and the prophet seems intentionally to have adopted this kind of metre, as being more diffuse, more copious, more tender, in all respects better adapted to melancholy subjects.

That the subject of the Lamentations is the destruction of the holy city and temple, the overthrow of the state, the extermination of the people, and that these events are described as actually accomplished, and not in the style of prediction merely, must be obvious, as our author conceives, to every reader. The prophet has so copiously, so tenderly, and poetically bewailed the misfortunes of his country, that he seems completely to have fulfilled the office and duty of a mourner. In the opinion of the learned prelate, there is not extant any poem, which displays such a happy and splendid selection of imagery in so concentrated a state. What can be more elegant and poetical than the description of that once flourishing city, lately chief among the nations, sitting in the character of a female, solitary, afflicted, in a state of widowhood, deserted by her friends, betrayed by her dearest

connections, imploring relief, and seeking consolation in vain? What a beautiful personification is that of "the ways of Sion mourning because none are come to her solemn feasts?" How tender and pathetic are the complaints that occur in ch. i. 12 and 16? But to detail its beauties, says Lowth, would be to transcribe the entire poem. Gregory's Transl. sect. 22. vol. ii.

Indeed the subject of this book is of the most moving kind; and the style throughout lively, pathetic, and affecting. In this kind of writing the prophet Jeremiah was a great master, according to the character which Grotius gives him: "Mirus in affectibus concitandis." See JEREMIAH.

LAMENTIN, L.A., in *Geography*, a town of the island of Martimo, on the W. coast. N. lat. 14° 36'. W. long. 66° 57'.

LAMENTUNG, a town of Thibet; 25 miles E. of Jhanf Jeung.

LAMETOUNAH, a town of Africa, in Sahara, about seven days' journey S. of Tripoli.

LAMETUK, a town of the state of New Jersey; 15 miles N.W. of New Brunswick.

LAMGI, a petty kingdom of Asia, that lies to the west of Nipal or Napaul; which see.

LAMIA, in *Biography*, the most celebrated female flute-player in antiquity. Her beauty, wit, and abilities in her profession made her regarded as a prodigy. The honours she received, which are recorded by several authors, particularly by Plutarch and Athenæus, are sufficient testimonies of her great power over the passions of her hearers. Her claim to admiration from her personal allurements, does not entirely depend, at present, upon the fidelity of historians; since an exquisite engraving of her head, upon an amethyst, with the veil and bandage of her profession, is preserved in the late king of France's collection, which, in some measure, authenticates the account of her beauty.

As she was a great traveller, her reputation soon became very extensive. Her first journey from Athens, the place of her birth, was into Egypt, whither she was drawn by the fame of the flute-players of that country. Her person and performance were not long unnoticed at the court of Alexandria; however, in the conflict between Ptolemy Soter, and Demetrius, for the island of Cyprus, about 312 years B. C. Ptolemy being defeated in a sea-engagement, his wives, domestics, and military stores fell into the hands of Demetrius.

Plutarch, in his life of this prince, tells us, that "the celebrated Lamia was among the female captives taken in this victory. She had been universally admired, at first, on account of her talents, for she was a wonderful performer on the flute; but, afterwards, her fortune became more splendid, by the charms of her person, which procured her many admirers of great rank." The prince whose captive she became, and who, though a successful warrior, was said to have vanquished as many hearts as cities, conceived so violent a passion for Lamia, that, from a sovereign and a conqueror, he was instantly transformed into a slave; though her beauty was now on the decline, and Demetrius, the handsomest prince of his time, was much younger than herself.

At her instigation, he conferred such extraordinary benefits upon the Athenians, that they rendered him divine honours; and as an acknowledgment of the influence, which she had exercised in their favour, they dedicated a temple to her, under the name of "Venus Lamia."

Athenæus has recorded the names of a great number of celebrated Tibicinæ, whose talents and beauty had capti-

vated the hearts of many of the most illustrious personages of antiquity.

Horace speaks of bands of female flute-players, which he calls *Amphibatarum collegia* (*Amphibia* is said, by the commentators, to be a Syrian word, which, in that language, implies a *flute*, or, *the sound of a flute*), and of whom there were still colleges in his time. But the followers of this profession became so numerous and licentious, that we find their occupation prohibited in the Theodosian code; however, with little success: for Procopius tells us, that in the time of Justinian, the sister of the empress Theodora, who was a Thibician, appeared on the stage without any other dress than a slight scarf thrown loosely over her. And these performers were become so common in all private entertainments, as well as at public feasts, obtruding their company, and placing themselves at the table, frequently unasked, that, at the latter end of this reign, their profession was regarded as infamous, and utterly abolished.

LAMIA, in *Ancient Geography*, a town of Greece, in Thessaly, famous for the war which the Greeks waged against the Macedonians, after the death of Alexander the Great.

LAMIA, in *Icthyology*. See SQUALUS *Carbarias*.

LAMIÆ, *Azazi*, among the *Ancients*, a kind of dæmons, or evil spirits, who, under the form of beautiful women, are said to have devoured children.

Horace makes mention of them in his *Art of Poetry*.—Some authors call them *Lamie*, à *laniando*. Philostratus says, they are also called *Luræ*, or *Lenures*, as if they were all the same. Bochart will have the word to be Phœnician, and derives it from  $\text{למית}$ , *to devour*; alleging, that the fable of the Lamie came from Lybia. See LAMUM.

LAMINA, in *Anatomy*, a term applied in anatomical descriptions to parts which take the form of thin plates. In this sense we speak of laminae of cellular substance, of membrane, of bone, &c.

LAMINA, in *Botany*, the expanded part of each petal of a polypetalous corolla, supported by the *unguis* or claw, and analogous to the limb of a monopetalous one. (See LIMBUS.) It generally spreads, so as to form a considerable angle with the claw, in order that its upper surface may be presented to the strongest light, as in the pink, and wall-flower, or stock. The term *lamina* is also used by Forskäll, and adopted by some others, for the expanded part of a leaf, that is, for the leaf itself; such application of the word is therefore altogether superfluous. See LEAF.

LAMINÆ, in *Phylogogy*, thin plates, or tables, whereof any thing consists.

LAMIODONTES, is the name given by Dr. Hill to the gloffopetræ.

LAMIOLA, in *Icthyology*, is the name given by the modern Italians to a fish called in Cornwall the *tope*. See SQUALUS *Galeus*.

LAMIRAS, in *Biography*, a famous poet and musician of Thrace, who, according to some authors, was the inventor of the Dorian mode. He lived before Homer, and is said to have been the first musician who united the voice to the sound of the cithara.

LAMISA, in *Geography*, a town of the principality of Georgia, in the province of Carduel; 60 miles W. of Teflis.

LAMIUM, in *Botany*, a Latin word of disputed meaning and derivation, used by Pliny to designate the Dead Nettle, for which it has ever since served as the botanical generic name. Some derive it from the supposed place of growth of the plant or plants in question, *ad lamas*, that is, about ditches or puddles by the way side; but this is by no

means appropriate. Linnæus in his *Philosophia Botanica*, p. 167, explains the word by *Lamia larvata*, a masked forcerefs, as if the shape of the flower, resembling a mask, or rather a gaping mouth beset with sharp teeth, had suggested that idea. Ambrosinus, however, indicates the most direct etymology, from  $\lambda\alpha\mu\alpha\iota$ , *the throat*, alluding to the shape of the flower, from which word also that of *lamia* itself, as the appellation of a certain voracious beast or fish, or of a forcerefs supposed to devour children, evidently originated.—Linn. Gen. 202. Schreb. 288. Willd. Sp. Pl. v. 3. 86. Mart. Mill. Diæt. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 392. Sm. Fl. Brit. 626. Juss. 113. Tourn. t. 85. Lamarck Illust. t. 506.—Class and order, *Didymia Gymnospermia*. Nat. Ord. *Verticillata*, Linn. *Labiata*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, dilated upwards, with five, nearly equal, awned teeth, permanent. *Cor.* of one petal, ringent; tube cylindrical, very short; limb gaping; throat inflated, compressed, gibbous, its margin furnished, at each side, with one or more little reflexed teeth; upper lip vaulted, roundish, obtuse, undivided or two-lobed; lower lip shorter, inversely heart-shaped, emarginate, more or less reflexed. *Stam.* Filaments four, awl-shaped, concealed by the upper lip, two of them longer than the others; anthers incumbent, oblong, hairy. *Pist.* Germen in the bottom of the calyx, four-cleft; style thread-shaped, of the same length and situation as the stamens; stigma cloven, acute. *Peric.* none, except the open-mouthed calyx, containing the seeds at the bottom. *Seeds* four, level-topped, short, triangular, convex at one side, abrupt at each end.

Ess. Ch. Calyx five-cleft, with spreading, bristle-pointed teeth. Upper lip of the corolla vaulted; lower two-lobed; throat inflated, its margin toothed at each side.

A very natural genus, well distinguished by its essential character, of the mouth of the flower being furnished with one or more teeth at each side. These are sometimes slender, and almost capillary; sometimes dilated and oblique. Linnæus thought the upper lip was necessarily undivided, or at most only toothed; but in some recently discovered species it has a two-lobed termination, above the vaulted part. The species of *Lanium* are as yet but imperfectly ascertained, notwithstanding what has been done in Willdenow and the new edition of the *Hortus Kewensis*. The 14th edition of *Syst. Veg.* enumerates but eight; Willdenow has thirteen. To these we have some to add, even from the gardens; and many mistakes to correct, respecting species already established. A review of the whole is necessary, though some may be less particularly mentioned than others. Our whole list amounts to twenty.

1. *L. Orvala*. Great Dead Nettle, or Balm-leaved Archangel.—Linn. Sp. Pl. 808. Curt. Mag. t. 172. (*L. pannonicum*; Scop. Carn. ed. 2. v. 1. 406. t. 27. *L. mellifæolium*; Mill. 1c. t. 158. *Galeopsis maxima* panonica; Clus. Hist. v. 2. 35.)—Leaves heart-shaped, unequally and sharply toothed. Throat of the corolla inflated; upper lip sharply toothed. Calyx coloured. Stem nearly cylindrical, smooth.—Native of Hungary, Carniola, and Italy. We have gathered it, of a very large size, near Castello Nuovo, 10 miles from Rome. The magnificence of its great crimson inflated flowers entitles it to a place in the flower-garden, where it is a hardy perennial, blooming in April or May, and sometimes suffers from our inclement springs. The stem, two or three feet high, is remarkable for its roundness and polished smoothness. The leaves are three or four inches long, and nearly as broad, rugose, dark, scarcely at all hairy. *Orvala* is an old name for Clary, used by Dodonæus; we know not why it was applied to this plant.

plant. If *Lanium montanum*, *favatile*, *fermè globrum*, *florè amplo*, *purpureo*, *cum labio superiori crenato*; Till. Pif. 92. t. 34. f. 1; quoted with doubt by Linnaeus, be this present species, the figure is very bad, yet we know no other to which it is more appropriate.

The *Orvala garganica*, Linn. Sp. Pl. 807. (*Papia garganica*, foliis urticae, altiùs et eleganter incisais, florè purpureo; Mich. Gen. 20. t. 17.) is now acknowledged to be a variety of *L. Orvala*, differing only in an accidental deeper division of the corolla, as well as of the leaves. Curtis in his specific character of the species in question, copied from *Syl. Veg.* ed. 14, retains an error of the transcriber or printer, *caulibus coloratis* for *calyce colorato*.

2. *L. levigatum*. Smooth Dead Nettle.—Linn. Sp. Pl. 808. Krock. Silf. n. 926, by the description. Sabbat. Hort. Rom. v. 3. t. 34. Willden. (*L. purpureum* fœtidum, folio parvo acuminato, fl re majore; Pluk. Phyt. t. 198. f. 1. *L. folio oblongo, florè rubro*; Segn. Veron. v. 3. 131. Galeopsis five urticae iners, florè purpurascente majore, folio non maculato; Bauh. Hill. v. 3. 321.)—Leaves heart-shaped, pointed, strongly serrated, nearly smooth as well as the stem. Upper lip of the corolla abrupt, entire. Calyx nearly smooth, with taper teeth much longer than its tube, and almost equal to the corolla.—Native of Italy. Pallas mentions finding it in Siberia, Krockner in Silesia. The Linnaean specimen was sent by Segnier, with his own synonym and that of J. Bauhin, the latter being verified by the place of growth, near Vicenza. The root is perennial, in some degree creeping. Stem a foot high or more, square, purplish, leafy, smooth, or slightly besprinkled with soft hairs curved downward. Leaves broad-heart-shaped, strongly and unequally serrated, with an elongated entire point, scarcely rugose, very little downy, rarely if ever spotted; the lower ones on long stalks, upper on short ones. Flowers eight or ten in a whorl. Tube of the calyx curved, but little dilated, pale, veiny, smooth or slightly downy, about a quarter of an inch long; teeth almost twice that length, very taper, somewhat hairy, extending beyond the full-grown unopened corolla, widely spreading. Corolla about the size of the common *L. album*; upper lip blunt, entire, gibbous, slightly downy, and bright purple externally, pale and smooth within; throat wide, often spotted, with one short narrow tooth, and the rudiment of another, at each side; lower lip small, of two rounded serrated spreading lobes.—Such is the plant of the Linnaean herbarium, but the long description in the *Spec. Plant.* seems to agree better with the *mofchatum* hereafter described, which therefore some have taken for the *levigatum*. Plukenet's figure is totally erroneous as to the calyx. Willdenow retains Boccone's synonym, misapplied to this plant by Linnaeus, and repeats it under *rugosum*, to which it properly belongs! Haller mistook his own N 270, which is *L. maculatum*, for *levigatum*, and transcribes from Linnaeus *caule brevis* instead of *levi*.

3. *L. rugosum*. Wrinkled Dead Nettle.—Ait. Hort. Kew. ed. 1. v. 2. 206. Willd. n. 3. (*L. hirsutum*; Lamarc. Dict. v. 3. 410. *L. amplo, serrato, nigricante, subrotundo, rugoso folio*; florè rubro; Bocc. Mus. 35. t. 23. *L. montanum hirsutum, folio oblongo, florè purpureo*; Till. Pif. 93. t. 35. f. 1.)—Leaves heart-shaped, acute, roundly serrated, rugose, hairy as well as the stem. Upper lip of the corolla abrupt, notched; lateral teeth solitary, bristle-shaped. Calyx slightly hairy, with teeth shorter than its tube.—Native of Italy, Sicily, and France; cultivated in our more curious gardens for at least 45 years past. It is perennial, flowering in July and August. The whole plant is much more hairy than the last. Leaves rather

crenate than serrated, all on longish stalks, dark, rugose, and hairy. Flowers purplish red; tube of the corolla smooth, curved, longer than the calyx-teeth; throat and upper lip hairy; teeth at each side of the mouth solitary, very long and narrow; lower lip small. There can surely be no doubt of Tilli's synonym, though hitherto neglected.

4. *L. garganicum*. Woolly Dead Nettle.—Linn. Sp. Pl. 808. Trew. Ebrat. t. 75. Sm. Exot. Bot. v. 1. 93. t. 48. (*L. garganicum subnucanum, florè purpurascente, cum labio superiori crenato*; Till Pif. 93. t. 34. f. 2.)—Leaves heart-shaped, bluntly serrated, rugose, downy as well as the stem. Corolla inflated; with a straight tube, much longer than the calyx; orifice with two teeth at each side.—Native of Italy. It has been cultivated in Chelsea garden ever since 1729, and flowers in May. Its soft downy greyish aspect, and finely rugose leaves, at once distinguish this species. The stem is thick and clumsy, two feet high. Flowers large, copious, and handsome, with a pale tube streaked with red, and light purple lips, the upper one cleft at the summit; the throat is nearly as much inflated as that of *L. Orvala*. Trew's figure was overlooked, or there would not have been another of this plant given in *Exotic Botany*, the latter work being intended for species not properly represented already. It is much to be wished that other periodical publications would so far pay regard to the same principle, as to give such plants a preference.

5. *L. maculatum*. Spotted Dead Nettle.—Linn. Sp. Pl. 809. (*L. Plinii campoclarensis et montanum*; Column. Ephr. 190. t. 192. f. 1. *L. n. 270*; Hall. Hill. v. 1. 118.)—Leaves heart-shaped, strongly serrated, acute, hairy. Tube of the corolla curved, longer than the calyx; upper lip entire; lateral teeth solitary, slender. Flowers about ten in a whorl.—Native of Italy, France, Greece, Switzerland, and Germany, flowering in the spring; it is imperfectly naturalized about Baywater, having probably escaped formerly from the neighbouring garden of Sir John Hill. Its natural situation is in waste ground, or about banks and hedges, where the radical leaves, distinguished by a broad irregular central stripe, make an elegant appearance through the Italian winter; but this mark commonly disappears from the upper leaves. The root is perennial, somewhat creeping. Stems a foot high, rather hairy. Leaves heart-shaped, rather acute but not pointed, strongly but bluntly serrated. Flowers purplish red, downy. Calyx tumid, nearly smooth, with fringed teeth about its own length, and much shorter than the tube of the corolla. The lower lip of the flower is concave and finely crenate.

Haller properly, perhaps, quotes the *Galeopsis* of Rivinus for this species; but the *Galeopsis* of Camerarius, Epit. t. 865, though said to have a red flower, is manifestly a representation of *Galeobdolon luteum*, Sm. Fl. Brit. 631. Both these are cited by Linnaeus under *Lanium album*; Rivinus having confounded *album* and *maculatum*. Pallas, as appears by his herbarium in the hands of A. B. Lambert, equally mistook *maculatum* for *purpureum*.

6. *L. album*. White Dead Nettle.—Linn. Sp. Pl. 809. Curt. Lond. fasc. 2. t. 45. Engl. Bot. t. 708.—Leaves heart-shaped, pointed, strongly serrated, hairy. Flowers about twenty in a whorl. Tube of the calyx shorter than its teeth. Upper lip of the corolla notched; lateral teeth solitary, lanceolate.—Native of waste ground, almost throughout Europe, flowering in spring, summer, and autumn. The leaves are more pointed than in the last, and unspotted; the flowers white and more numerous, rarely assuming a blush or pale purple. There is commonly a considerable distance, or naked part of the stem, between the stalked lower leaves, and

and the more fertile upper ones where the flowers are situated. The summit is overtopped by one or two pair of leaves without flowers. The tube of the corolla is longer than the calyx; its lower lip flattish, wavy, scarcely crenate.

7. *L. cabitatum*. Muffin Dead Nettle.—Leaves heart-shaped, bluntish, crenate, hairy, on longish stalks. Flowers overtopping the stem. Tube of the calyx equal to its teeth. Upper lip of the corolla notched; lateral teeth solitary, very slender.—We know not the native country of this species, which we obtained from Chelsea garden, and have long cultivated. It is sometimes overlooked as a variety of the last; sometimes sold for *L. mollis* hereafter mentioned; yet no species can be more distinct. It is perennial, flowering in July; when the copious and delicate semitransparent white flowers, which rise in two whorls above the top of each stem, look as if a thin muffin veil had been thrown over the plant, especially while the dew is upon them. The lateral teeth are peculiarly slender; the anthers pale, with fearful pollen. The leaves are small, roundish, light green, speckled with paler or whitish spots. Stems rather decumbent. We can find no synonym for this plant.

8. *L. Ariatum*. Pencilled Dead Nettle.—Sm. Prodr. Fl. Græc. Sibth. 405. Fl. Græc. ined. t. 557.—Leaves heart-shaped, bluntish, ferrated, on longish stalks. Upper lip of the corolla cloven; its segments spreading and toothed; lateral teeth double. Found by Dr. J. Sibthorp, (who suspected it to be the *Βαλλάνης* of Dioscorides), plenty in all the waste ground of Greece and the Archipelago; yet no other modern botanist appears to have noticed this elegant and striking plant. Its habit is not unlike *L. album*, but the leaves are rounder, with longer stalks, and the stem is more uninterruptedly leafy. The flowers are singularly large and handsome, white striped with crimson, composing several whorls, the upper ones rising above the top of the stem, as in the last. Their upper lip ends in two oblong toothed divaricated lobes; the lower is convex and crenate; the lateral teeth are in pairs, acute and spreading.

9. *L. bifidum*. Cloven White Dead Nettle.—Cyrill. Rar. fasc. 1. 22. t. 7. Willden. (L. parvum, flore albo, cum labio superiori bifido; Till. Pil. 93. L. æquicolum; Column. Ecephr. 191. t. 192. f. 2.)—Leaves triangular-heart-shaped, deeply cut and crenate; the upper ones crowded. Calyx tumid, with shortish triangular teeth. Upper lip of the corolla cloven; its segments spreading, emarginate, lateral teeth solitary.—Found in waste ground about Naples, towards the sea, where the writer of this gathered it in March 1787. Its general habit approaches to *L. purpureum*, but the flowers are snow-white, with a cloven summit, and the floral leaves, crowded (as in that species) about the top of the stem, whose middle part is almost naked, are of a triangular heart-shape, deeply cut and lobed as well as crenate, hairy, and marked with a narrow central white stripe, just as Columna represents them, concerning whose synonymy we presume there can be little doubt, though he appears not to have seen the corolla. Spirits of wine extract an orange colour from these flowers, which we do not perceive in any other *Lamium*.

10. *L. moschatum*. Mucky White Dead Nettle.—Mill. Dict. ed. 8. n. 4. Ait. Hort. Kew. ed. 2. v. 3. 394. (L. orientale, nunc moschatum nunc festidium, magno flore; Tournef. Cor. 11.; according to Miller, but the Hort. Kew. rejects this synonym, without assigning a reason.)—Stem very smooth. Leaves heart-shaped, obtuse, crenate; the floral ones nearly sessile. Calyx-teeth nearly equal to the corolla. Upper lip of the corolla entire; lateral teeth solitary, dilated.—Native of the Levant. Miller cultivated it

in 1739, but it found no place in the first edition of Hort. Kew. This we believe arose from its having been taken for, or confounded with, the *levigatum*. Into this error we ourselves have formerly fallen, misled by the long description in Linn. Sp. Pl. 808, which so precisely accords with the *moschatum*, rather than with *levigatum*, that we have no doubt from which of the two it was made. This is an annual species, cultivated, or rather spontaneously found itself, from time immemorial in Chelsea garden near the entrance, and flowering in the spring. The leaves of the young plants that come up in autumn remain through winter, and according to Miller, are prettily marked with white like the Cyclamen. The stems, from 10 to 20 inches high, are remarkably smooth, with blunt edges, and purplish. Leaves of the stem heart-shaped, approaching to triangular, rather elongated but obtuse, veiny, of a light glaucous green, smooth or finely downy, the margin crenate rather than ferrated; the floral ones nearly sessile. Whorls several, not reaching to the top of the stem, each of about ten white flowers, whose calyx is pale and smooth, with very long tapering rough-edged teeth, extending beyond the mouth of the corolla. The upper lip of the latter is downy, convex, abrupt, and entire; lower of two rounded, flattish, slightly crenate lobes; lateral teeth solitary, broad, pointing forward. We have not noticed the mucky feces.

11. *L. plechonoides*. Ground-ivy-leaved Dead Nettle.—(Moldavia orientalis, hederæ terrestris folio; Tourn. Cor. 11.)—Leaves heart-shaped, strongly crenate, on long stalks. Calyx-teeth short, triangular. Corolla longer than the leaves; upper lip notched; lateral teeth in pairs.—Gathered in the Levant by Tournefort, one of whose specimens is before us. No recent author seems to have known this species, which is perhaps more akin to our *Ariatum*, N° 8, than any other. The leaves are small, not an inch long, correctly heart-shaped, strongly crenate, or ferrated, slightly hairy, on footstalks mollly twice their own length, except those of the floral ones, which scarcely exceed the calyx. The teeth of the calyx are short, triangular, awnless, roughish. Corolla purple, downy; tube full twice the length of the calyx; throat inflated; lateral teeth small, double; upper lip abrupt and deeply notched; lower of two rounded wavy lobes. Anthers very hairy.

12. *L. tomentosum*. Downy Dead Nettle.—Willd. n. 11. (L. orientale incanum, flore albo, vel purpurascente, cum labio superiori crenato; Tourn. Cor. 11.)—Leaves roundish-heart-shaped, strongly crenate, downy on both sides, stalked. Calyx-teeth lanceolate, very hairy. Upper lip of the corolla crenate, very hairy; lateral teeth solitary, awl-shaped, narrow.—Gathered by Tournefort in Armenia. This is remarkably downy and hoary, especially the younger foliage, the calyx, and the upper lip of the corolla. The leaves are much under an inch in length, very deeply and sharply crenate, the upper ones most pointed, all densely villous, on stalks of various proportions. Teeth of the calyx as long as its tube, lanceolate, narrow, acute, densely villous. Corolla about the size of *L. album*, purplish or white; its tube as long as the calyx, smooth; throat but little inflated; lateral teeth solitary, long and slender; upper lip much arched, minutely crenate, villous; lower of two rounded, flat, entire lobes.

13. *L. molle*. Pellitory-leaved White Dead Nettle.—Ait. Hort. Kew. ed. 1. v. 2. 297. ed. 2. v. 3. 394. (L. parietarie facie; Moris. Hort. Blæs. 278. L. album, parietarie folio, virginianum; Pluk. Almag. 203. Phyt. t. 41. f. 1.)—Leaves pointed, stalked, nearly entire; the lower ones heart-shaped, the upper ovate. Calyx-teeth brittle-shaped. Upper lip of the corolla crenate, hairy; lateral teeth

teeth solitary, awl-shaped.—Native of Virginia, as appears by Plukenet's synonym, overlooked by succeeding writers. This plant seems to have been early in our gardens, but is now little known, if not totally lost. Another species, hereafter described by the name of *ocymifolium*, is generally mistaken for it, and is referred to as *molle* in *Fl. Brit.* under *L. purpureum*. The true *molle* is, however, now well known to us, by dried specimens from the French gardens. Its habit and size approach to the *album*, but the *leaves* are remarkable for being either quite entire, or very slightly toothed about the middle part only; they are an inch and a half long, broad at the base, and often heart-shaped, the extremity pointed and acute; both sides somewhat downy, veiny, even, not rugose. The *stalks* of the floral leaves are very short; those of the rest longer. *Flowers* the size of *L. album*, white; their tube as long as the calyx-teeth, which are bristle-shaped, narrow and hairy. *Seeds* very smooth.

14. *L. ocymifolium*. Basil-leaved Red Dead Nettle.—(*L. pusillum rubrum*, *parietaria facie*, *americanum*; Pluk. *Almag.* 204. *Phyt.* t. 41. f. 2.)—Leaves ovate, obtuse, entire, stalked; the upper ones crowded. Stem naked in the middle. Calyx-teeth lanceolate.—This has long been in Chelsea garden, where it is almost a weed. From Plukenet's synonym it appears to have come from America. No succeeding author has noticed the plant. The root is small and annual. Stem a foot high, or something less, simple, except a small branch or two near the base, erect, square, smooth, leafy at the bottom and top only, being for the greater part of its length entirely naked, like the stem of *L. purpureum*, but still more remarkably so. The lower leaves are few, roundish-ovate, slightly crenate, on longish stalks, and nearly smooth; floral ones about six or eight pairs, crossing each other, crowded together at the top of the stem, composing a sort of pyramid, each leaf about three quarters of an inch long, stalked, ovate, obtuse, tapering at the base, entire, except here and there a casual notch in some of them, all slightly hairy, paler underneath. Whorls crowded, of numerous small purple flowers, much like those of *L. purpureum*. Calyx nearly smooth, its teeth as long as the body, spreading, broad at their base, with taper rigid points. *Seeds* curiously besprinkled with pale, prominent, minute, tubercles, as is more or less the case in the three following.

15. *L. purpureum*. Common Red Dead Nettle.—Linn. *Sp. Pl.* 809. *Curt. Lond. fasc.* 1. t. 42. *Engl. Bot.* t. 769. *Fl. Dan.* t. 523.—Leaves heart-shaped, obtuse, unequally crenate, stalked; the upper ones crowded. Stem naked in the middle. Calyx-teeth lanceolate. Tube of the corolla closed with hairs near the bottom.—Very common, in waste as well as cultivated ground, throughout most parts of Europe, flowering at various seasons. The root is annual. Stem from six to twelve inches high, square, ascending, often branched at the bottom, naked in the middle, crowded with leaves and flowers at the top. Leaves broad-heart-shaped, bluntish, rugose, unequally crenate, downy, on stalks of various lengths. Flowers in whorls among the upper leaves, reddish-purple, variegated with white, and spotted with dark purple, their lateral teeth small, in pairs, very near the under lip. The inside of their tube was found by Mr. J. D. Sowerby to be closed near its base with a dense circle of hairs; see *Engl. Bot.* t. 1933. The calyx is like the last species.—A curious variety was found near Sudbury, by Mr. Joseph Andrews, who communicated it to the late professor Martyn, sen., and whose original specimen is in our hands. In this the margin of all the leaves is perfectly entire. The flowers are rather smaller than ordinary, and were said to produce no seed. This variety is in *Engl.*

*Bot. p.* 769, at the end, mistaken for our *ocymifolium* last described.

16. *L. incisum*. Cut-leaved Red Dead Nettle.—Willd. n. 9. *Engl. Bot.* t. 1933. (*L. diffusum*; With. 527. *L. purpureum*  $\beta$ ; Sm *Fl. Brit.* 627. *L. rubrum minus*, *foliis profunde incisis*; Raii *Syn.* 240. Pluk. *Phyt.* t. 41. f. 3.)—Leaves heart-shaped, dilated, obtuse, stalked, irregularly cut; the upper ones crowded. Stem naked in the middle. Calyx-teeth lanceolate. Tube of the corolla pervious.—Found in cultivated ground in France and England. We have it from Norfolk and Suffolk. This is so like the last, except the leaves being more deeply cut, that we should have still considered it as a variety, but for the want of hairs in the tube of the flower. The whole shape of the corolla, indeed, is more slender, approaching to that of *L. ocymifolium*, or of the following *amplexicaule*.

17. *L. amplexicaule*. Common Henbit Dead Nettle.—Linn. *Sp. Pl.* 809. *Curt. Lond. fasc.* 2. t. 46. *Engl. Bot.* t. 770. *Fl. Dan.* t. 752. (*Galeopsis folio caulem ambiente*, *major et minor*; Rivin. *Monop. Irr.* t. 63.)—Floral leaves sessile, kidney-shaped, obtuse, strongly crenate, or somewhat lobed, embracing the stem. Teeth of the calyx linear-awl-shaped, as long as its tube.—Native of sandy fields of Europe, flowering in the spring. Easily distinguished by the rounded, sessile, strongly crenate, and often in some degree lobed, leaves of the stem, in which it essentially differs from the two last. The calyx, moreover, differs in being extremely hairy, with more upright teeth, as long as the body, and of a very narrow awl-shaped, almost linear, figure, by which latter character it is also distinguished from two hereafter described. The little red flowers are angularly pretty, the bright crimson of their downy upper lip, while the rest of the corolla is smooth and paler, glitters, like minute rubies, when moist with dew, and attracts the eye at a considerable distance. A small undivided tooth stands at each side of the mouth, though Willdenow once thought otherwise, and on account of that supposed deficiency, founded a new genus on this plant and *Galeobdolon luteum*, by the name of *Pollichia*; a measure now happily abandoned, as those two plants have scarcely any character in common. Some of the earlier flowers of *L. amplexicaule* never expand, but the internal organs are perfect, and produce good seed. Linnaeus says all its flowers are generally thus closed in Sweden, owing, probably, to the coldness of the season when it blooms.

18. *L. palmatum*. Palmate Henbit Dead Nettle.—(*L. multifidum*; Pallas. *It.* v. 1. 168.)—Floral leaves sessile, embracing the stem, palmate; lobes three or five-cell. Teeth of the calyx lanceolate, pointed, as long as its tube.—Gathered on the banks of the Wolga by Pallas, who, as appears from his specimens lent us by Mr. Lambert, first took it for *amplexicaule*, which it most nearly resembles, and afterwards for *multifidum*, under which name it is mentioned in his travels, quoted by Willdenow. From the latter it differs totally in size and aspect, as well as in the character of its leaves and calyx. From the former it is satisfactorily distinguished, however like at first sight, by the deeply palmate floral leaves, whose lobes are subdivided into three or five broad spreading segments; and still more decidedly by the broad base of the calyx-teeth, which contract suddenly into a sharp point. The corolla varies in size, or degree of expansion, as in the preceding. The root, like that, appears to be annual, throwing up several stems about a span high. The lower leaves are stalked, but otherwise resemble the upper ones, except, indeed, those near the root, which are smaller and less cut.

19. *L. multifidum*. Finely-cut Oriental Dead Nettle.—Linn.

Linn. Sp. Pl. 809. (L. orientale, foliis eleganter laciniatis; Tourn. Cor. 11. Comnel. Rav. 26 t. 26.—Floral leaves sessile, divided to the base, into many lobed or pinnatifid segments. Teeth of the calyx triangular, pointed, one-fourth the length of its tube.—Gathered by Tournesort in the Levant. He probably brought home seeds, by which it was introduced to the gardens of France, Holland, and, if Miller be correct, Chelsea physic-garden. On his authority this species has found a place in the new edition of Hort. Kew, though long since a stranger amongst us. Indeed the plant is very little known to botanists. We have an indubitable specimen, but whether wild or cultivated we know not. It is in all its parts thrice the size of the two last. The root seems to be annual, throwing up several square, leafy, finely downy, often branched stems. The floral leaves are an inch or inch and half long, sessile, nearly smooth, divided almost, or quite, to the bottom into five segments, the middle one being the largest, all narrow at the base, dilated outwards, deeply lobed or pinnatifid, the lobes rounded or bluntnif. Flowers many in each whorl, as large as those of *L. album*, or larger, of a fine red, with fo very hairy an upper lip as to resemble some kind of *Phlomis*. The lateral teeth are solitary and acute. Calyx densely clothed with silky hairs, its teeth broad, about a quarter as long as its tube, pointed, one rather wider than the rest.

20. *L. ? bipidulum*. Rough-stalked American Dead Nettle.—Michaux Dorcal-Amer. v. 2. 4.—Stem rather brittle. Leaves on long stalks, broad-heart-shaped, slightly downy. Flowers axillary, solitary.—Found in shady woods about the river *Tennafsee*, by Michaux, who mentions that the *corolla* is moderately large and white. The flowers being solitary in the bosom of each floral leaf, excites a great doubt of its genus, but having no other information respecting this species, we here subjoin it to the rest, till further information can be procured. S.

LAMJUNGH, in *Geography*, a country of Asia, dependent on Thibet, N. of Gorkah.

LAMLASH, or HOLY ISLAND, an island situated before the bay of Lamash, about two miles long and half a mile wide; the whole being a mountain covered with heath, but having sufficient pasture and arable land to feed a few cows, sheep, and goats, and to raise a small quantity of corn, and few potatoes. N. lat. 55 34'. W. long. 4° 58'.

LAMLASH, a town or village of Scotland, on the E. coast of the island of Arran, situated on a bay to which it gives name, and which, according to Pennant, forms the safest harbour in the globe, with depth of water for the largest ships. N. lat. 55 35'. W. long. 5° 59'.

LAMMAS-DAY, the first of August; so called, as some will have it, because lambs then grow out of season, as being too big. Others derive it from a Saxon word, signifying *loaf-mass*, because on that day our forefathers made an offering of bread prepared with new wheat.

On this day the tenants who formerly held lands of the cathedral church in York, were bound by their tenure to bring a lamb alive into the church at high mass.

It is celebrated by the Romish church in memory of St. Peter's imprisonment.

LAMMERMUIR, in *Geography*, a mountainous district of Scotland, forming the N. part of the county of Berwick, about 16 miles long and six broad.

LAMNE, in *Ichthyology*, a name given by Appian, and some other of the old Greek authors, to the common shark, or, as we usually call it, the *robite shark*, the *lamia* and *canis carcharias* of authors. See *QUALUS Carcharias*.

LAMNICKII, in *Geography*, a town of the duchy of Stiria; 10 miles N. of Cilley.

LAMO, a sea-port of Africa, on a small island formed by a river on the coast of Zanguebar, dependent on the Portuguese. S. lat. 1° 55'. E. long. 41 27'.

LAMOIGNON, WILLIAM DE, in *Biography*, marquis of Balville, descended from an honourable family, was born at Nivernois in 1617. He was admitted a counsellor of Paris in 1635, made matter of requests in 1644, and in 1658, on account of his great probity and honour, he was raised to the office of first president of the parliament. Upon his nomination to the presidentship, cardinal Mazarin said to him, "If the king had known a worthier and fitter man, he would not have appointed you;" but he paid him a much higher compliment, by refusing a large sum of money, offered by another person for the situation, at the same time observing, "Whatever occasion his majesty may have for money, it would be better to expend it for a good president, than receive it." Lamoignon did not disappoint the expectations formed of him: he fulfilled all the duties of the situation with equal zeal and prudence, supporting the dignity and privileges of the body over which he presided, discouraging the chicanery of the bar, raising his voice for the people, and devoting his health and life to the public service. He was once sounded with regard to his opinion of a criminal, over whose trial he was to preside as judge, by Colbert the minister, to which he replied, "A judge gives his opinion but once, and that is from the bench." He died at the age of sixty, in the year 1677. His "Arrests," on various important points of French law, were first published in 1702, and again reprinted in 1781. In his manners he was simple, in his conduct rather austere, but to the widow, the orphan, and the friendsless, he was the mildest of all human creatures. He relaxed from the toils of his office, in the pleasures of literature, and literary men. Boileau, Racine, Bourdaloue, &c. were his particular friends. Moreri.

LAMOIGNON, CHRISTIAN FRANCIS DE, eldest son of the preceding, was born at Paris in 1644: of his education the most exact care was taken by his father, and at a proper age he was placed in the Jesuits' college, under the particular tuition of the celebrated father Rapin, whose favourite disciple he was. Having finished his studies, he travelled through different countries for the improvement of his mind, and in 1666 he was admitted a counsellor of parliament. In 1674, he was appointed to the office of advocate-general, which he held during the space of 25 years, with the highest and most unblemished reputation, distinguished as much for his eloquence, as by his zeal for justice and the public good. In 1690 the king nominated him to a post of more ease, and better adapted to his health, but his love of employment retained him several years longer at the bar, till at length, being urged as well by his own feelings, as the representations of his family and friends, he sought for an honourable repose. He then indulged in the love of letters, and, in 1704, was admitted a member of the Academy of Inscriptions, of which he was soon appointed the president. In this station he displayed as much talent and readiness in discussing a literary question, as he had formerly done a point of jurisprudence. He died in 1709. Many of his speeches were published, but the only work which he sent to the press was "A Letter on the Death of Father B. urdaloue." Moreri.

LAMOILLE, in *Geography*, a river, which runs into lake Champlain, 28 miles N. of Newhaven, N. lat. 44 37'. W. long. 73 14'.

LAMORRAN CREEK, a creek in the English channel,

on the coast of Cornwall, at the mouth of a small river, which joins the Fal; 3 miles S. of Truro.

LAMOTIS, in *Ancient Geography*, a small country of Asia, in Cilicia, which took its name from the town of Lamus. Ptolemy.

LA MOTTE, in *Biography*, an admirable violinist, born in Flanders: when very young, he was regarded as the first solo player at Vienna. In 1777 he came to England. He had his first regular instructions from Giardini, and it is related of him, that when he quitted Giardini, he travelled through Italy, full in search of another master; and being arrived at Leghorn, where Nardini then lived, he would have become his scholar; but after hearing that celebrated performer execute one of his own solos, of the most difficult kind, and being, in his turn, asked to play, he desired leave to perform the same solo which he had just heard, and which was new and in MS. so that he never could have practised it; however, he acquitted himself so well, that Nardini declined taking as a *scholar* one who was already to be a *master* of his instrument.

The concertos which he played at the Pantheon concerts were full of new difficulties of execution, expression, and double stops, which he performed with such grace and seeming facility, that none but fiddle-players, who know the finger-board of the violin, and the difficulty of bowing certain passages, would imagine that he had any difficulties to encounter. His tone was not very powerful, but perfectly sweet and even, from the lowest note on the violin, to the end of the finger-board. His high notes were of the flute kind, nearly as sweet as the *sons harmoniques*.

This performer, whose constitution was very delicate, seemed consumptive, when he left England in 1779, at which time he returned to the continent, where he died.

LAMOTTE, WILLIAM, an eminent French surgeon and accoucheur, was of Valogne, in Normandy. He studied his profession at Paris, where he attended the practice of the celebrated hospital, l'Hotel-Dieu, during five years: He was distinguished particularly by his skill and success as an accoucheur, not only at his native town, but throughout the neighbouring country, during a long period. He left three sons, two of whom were physicians, and the third succeeded him in his own department.

His first publication, entitled "Traité des accouchemens naturels, non naturels, et contre nature," was first published in 1715. It went through many editions, and was translated into several languages; and was generally deemed the best treatise of the time, after that of Mauriceau, which Lamotte censured. It contained an account of four hundred cases, with judicious practical reflections, the result of thirty years' practice. His next publication was a "Dissertation sur la Generation, et sur la Superfetation;" containing also an answer to a book, entitled "De l'Indecence aux Hommes d'accoucher les Femmes, et sur l'Obliquité aux Mères de nourrir leurs Enfants," Paris, 1718. He denied the occurrence of superfetation, and combated the opinions of the ovarists, and the doctrine of animalcules: and in his reply to Hecquet, he relates a number of untoward accidents, occasioned by the ignorance of midwives. In 1722, he published, "Traité complet de Chirurgie, contenant des Observations sur toutes les Maladies chirurgicales, et sur la Manière de les traiter," which has been several times reprinted. The last edition was published in 1771, with notes by professor Sabatier. This was a valuable practical work, but disfigured by the egotism of the author, and his contempt for his professional brethren; whence Haller observes, "laudes suas non negligit, non

perinde famæ collegarum studiosus." Haller *Bibl. Chir. Eloy. Dict. Hist. de Med.*

LAMP, an instrument used for the combustion of liquid inflammable bodies, for the purpose of producing artificial light.

The most simple lamp consists of a vessel of almost any shape, containing oil or alcohol, with a tube projecting a little above the surface of the liquid, and containing any fibrous substance capable of raising the liquid to the top of the tube, by capillary attraction. The oil, thus raised and diffused through the fibrous substance, is so detached from the main body of the liquid, as to admit of being heated to a temperature sufficient to volatilize the oil, the vapour of which, in a state of combustion, constitutes the flame of the lamp.

In the management of the lamp of the most simple kind, so far as relates to the supply of oil, three things are necessary to be observed. 1. The wick must be of such a substance as best to promote capillary attraction. 2. It should not be twisted too much, in which case its capacity for the oil is too little; nor should it be so loose as to diminish materially its capillary attractive power. This is frequently the case, when the wick has been too long immersed in the oil. 3. With regard to the distance of the flame from the surface of the oil.—If the flame be too near the surface, a lesser quantity of oil will acquire the intense heat necessary to raise it into vapour, since the heat communicates with the fluid. On the contrary, when the flame is too high above the oil, the capillary attraction, which decreases in some ratio of the distance, is insufficient to supply the necessary quantity of oil.

Experience has long ago established, that cotton is the best medium for the transmission of the oil, which is prepared in a particular way for the purpose.

During the slow combustion of oil, as observed in the common lamp, as well as that of tallow in candles, the fatty matter is decomposed, producing a quantity of vapour, which inflames in contact with oxygen; and a cloudy exhalation in the form of smoke, consisting of numerous small particles of carbonaceous matter, which, if collected, constitute the article called lamp-black. Besides the offensive smell and appearance of this substance, there is an evident waste of combustible matter, capable of producing both light and heat.

The evil arising from the smoke and smell of lamps was formerly so great, as to prevent their introduction into domestic use, notwithstanding the strong inducement of convenience and economy.

The public have long been in possession of a complete remedy for this, and several other disadvantages in lamps, by the invention of the Argand lamp. This invention embraces so many improvements upon the common lamp, and has become so general throughout Europe, that it may be justly ranked among the greatest discoveries of the age. As a substitute for the candle, it has the advantage of great economy and convenience, with much greater brilliancy; and for the purpose of producing heat, it is an important instrument in the hands of the chemist.

We may with some propriety compare the common lamp and the candle to fire made in the open air, without any forced method of supplying it with oxygen; while the Argand lamp may be compared to a fire in a furnace, in which a rapid supply of oxygen is furnished by the velocity of the ascending current. This, however, is not the only advantage of this valuable invention. It is obvious that if the combustible vapour occupies a considerable area, the oxygen

gen of the atmosphere cannot combine with the vapour in the middle part of the ascending column. The outside, therefore, is the only part which enters into combustion; the middle constituting smoke. This evil is obviated in the Argand lamp, by directing a current of atmospheric air through the flame, which, instead of being raised from a solid wick, is produced from a circular one, which surrounds the tube through which the air ascends. Before we enter more fully into the merits of the Argand lamp, we shall give a description of it, with reference to drawings of its different parts. These drawings are taken from the lamps of modern construction, which have recently been much improved. The wick is now raised by a screw, instead of the rack and pinion; which is so great an improvement upon the latter, both in simplicity and convenience, that it is becoming general.

*Fig. 1. (Plate Lamp)* is a view of the lamp complete, to a scale of one-third the real size. A is a reservoir, which is on the principle of the bird-fountain, keeping the oil always at the same height in the burner B, through the communication C.

The burner B is composed of three tubes, *a*, *b*, and *s*. The two first are seen in section only; while the whole of one side of *c* is seen.

*Fig. 2.* The tube *c* is soldered into the bottom of the tube *a*, and open throughout, communicating with the receptacle D, which screws on the outside of the tube *a*, and serves at once to catch the oil which may accidentally run over the tube *a*, and admit the air through the apertures *n*, *p*, which has to ascend through the tube *c*.

The oil which comes in through C will occupy the cavity *g b*, between the exterior surface of the tube *c*, and the interior of *a*, which must, of course, rise to the height of the aperture *t*, in the reservoir A, as seen in *fig. 3*. The part *d e*, *fig. 2*, called the bucket, is a short tube to receive the circular wick. This part is seen in *fig. 4*, with the wick upon it, *d f*. It is made to work freely upon the tube *c*. The latter has a spiral groove cut upon it, into which a pin at *e* enters; so that when the bucket is turned round by a catch *r*, which works in a longitudinal slit in *b*, it will be raised or lowered by turning the tube *b* in different directions, and is, therefore, the means of raising or lowering the wick.

A wire, *s*, is attached to the tube *b*, which bends down parallel to, and touching the outside of, the tube *a*. The part *k l x z y* fits upon the tube *a*. The part *k l* is provided with shallow sides to receive the glass E, and is connected with a ring *y*, by wires *x*, *z*, *fig. 1*. The whole of this part turns with the glass E, and at the same time carries round the tube *b*, by means of the wire *s*, which is connected to *k l* and *y*, for the purpose of raising or lowering the wick. When oil is to be introduced into the reservoir, A is screwed off, and inverted. The aperture *t*, *fig. 3*, is then opened, by pushing down the sliding socket *v*, which ought to fit the interior cylinder pretty accurately. The globe must now be filled at the hole *t*: the socket *v* is next pulled over the hole. The ball may now be held in an erect position, and replaced in the lamp; after which the socket *v* may be pushed below the hole *t*, by means of the handle *w*. The oil will now rise to a height in F, and in B, till it reaches the higher part of the aperture *t*, *fig. 3*, and will maintain the same height till the oil in the globe gets to the same level. The reason of this hydrostatical phenomenon will be easily perceived. When the oil in B and F gets a little below the aperture *t*, a bubble of air enters and ascends into the globe, the same quantity of oil descending to give it place.

This reservoir, although it is fully fitted for giving a re-

gular supply of oil, is attended with one disagreeable property. The air in the upper part of the globe being much more expandible by heat than liquid bodies in a warm room, its spring becomes greater than the pressure of the exterior air; in consequence of which, the oil is apt to flow over the tube *a*, and liable sometimes to overflow the vessel D. Another disadvantage is also attendant on this bulky reservoir. When the lamp is used on a table, the shadow renders one side of it useless. The above inconveniences in the Argand-lamp have been, in some measure, obviated by the invention of Mr. Peter Kier of Kentish Town. He raised the oil by means of a column of a heavier fluid. In the plate, *figs. 5* and *6*, are exhibited an elevation and section of one of these lamps; the section only requires to be explained. From the slender figure of the vase, it is evident that the flame is permitted to throw its light in all directions, downwards and upwards, nearly in the same manner as a candle. The interior part is divided into several compartments by the diaphragms at F and C. The space A A above F is open to the atmosphere; but the space B B, beneath C, is close. A tube F G proceeds from the space A A to the space B B, so as to reach nearly to the bottom at G, and another tube, CD, proceeds from B B upwards through A A, without communicating with this last space, and is enlarged at the upper part, so as to receive a wick with the apparatus of Argand, or any other. A solution of sea-salt, or the mother water of salt, being first poured in, by measure, at E, flows down the tube into B B, and fills that space. A like measure of oil is next poured, which also descends into B B, and forces the dense saline liquor upwards through G F into the space A A. The specific gravity of this last is adjusted by dilution; so that when the space A A is properly filled, the oil shall stand in equilibrio at the requisite height near E, viz. the surfaces in A and at E are elevated above the lower orifice at G, in the inverse proportion of the specific gravities.

This proportion is usually about three to four; so that if any of the oil be taken away from E by combustion, or otherwise, there will be a subsidence of the heavy fluid in A A to preserve the equilibrium; and during the whole subsidence in A A, there will be a correspondent depression of the upper surface of oil, near E, which will be measured by four-thirds parts of the first elevation of the dense fluid above the partition F D. Now, the fall in A A may be rendered very small, by enlarging the diameter of the vessel at that part, and at B B; and the elevation of E above A, and, consequently, the insulation of the radiant flame, may be governed at pleasure by prolonging the interval D C.

It is possible, in the manipulation of this lamp, that some oil, or pieces of snuff, may fall into the space A A, and float upon the liquid. This effect is, to a certain extent, beneficial, because the covering of oil prevents evaporation; but if this should require to be remedied, it is easily done, by pouring the whole contents of the lamp into a basin, and after a few moments repose, or straining, returning the liquids again into the lamp at E by a syphon, or funnel, in which they will take their proper places by means of their relative weights. We may recapitulate the good qualities of this lamp in a few words. 1. It is capable of any form or apparatus for the burners. 2. It prevents no obstacle to intercept the emitted light. And, 3. As it raises the oil by the mere gravitation of a non-elastic fluid, it cannot, in any case, like the fountain lamp, raise more than is wanted.

A great variety of other lamps are at present exposed for sale, having different means of supplying the oil, but none so sufficiently striking as to merit minute description.

The grand and most essential properties of the lamp are confined to the means of supplying the flame with oxygen, so as to produce the most perfect combustion, and for which we are almost entirely indebted to *Argand*. We shall therefore conclude this article with some remarks upon the merits of this valuable invention, and shew in what instances it has been improved in its most essential points.

In the original lamp of *Argand*, a perpendicular column of air was perpetually ascending through the glass chimney of the lamp; one part of it passing through the central tube *c*, *figs. 1* and *2*; and the rest through the holes *q* and *m*, round the circular plate *k l*. This part was formerly a cylinder extending down to the receptacle *D*.

With this perpendicular current alone, it is well known that the *Argand* lamp would not burn *walpole* oil, and the purification of this oil, to render it fit for the purpose, became a desideratum, on account of the high price of the *Spermæti* oil. This great object was not accomplished by purifying the oil, but an improvement was made in the lamp itself, which effectually answered the desired purpose. For this discovery we are indebted to an ingenious and scientific manufacturer of Derby. It is curious to observe, however, that no advantage was taken of this invention for twenty years, during which time it had been used in the cotton mills of this discoverer, and now the same end is accomplished by a simpler contrivance. The above improvement consisted in placing over the mouth of the tube *c* a plate of metal about the diameter of the tube, and at such a height as to be a little short of the apex of the flame. By this means the ascending column of air was turned out of its perpendicular course, and thrown immediately into that part of the flame where the smoke was formed, and which, by this means, was completely consumed, producing at the same time a more than ordinary brilliant light.

The same effect is now produced by the shape of the lamp glasses *E*, in the figures already alluded to. The exterior current of air which enters the holes *q, m*, &c. rises with a velocity proportioned to the length of the glass chimney, and to the rarefaction of air in the same, strikes upon the shoulders *N* and *O*, by which it is propelled into the upper part of the flame. This happy form in the glass appears to have been the result of accident. Had the manufacturer been aware of its importance, it would have either been the subject of a patent, or at least strongly recommended to the public in the way of puffing. We see at the present time different shaped glasses, some of which are rather worse than the original plan, instead of improvements.

The theory of the action of the chimney lamp, is so nearly allied to the principles of furnaces, which we have given under that article, that the reader will no doubt get some useful hints, relative to the construction of lamps, by perusing the same.

The hydro-pneumatic lamp is constructed upon similar principles to the celebrated water engine erected by father *Hell*, at *Chrennitz*, in Hungary; the descent of one-half of the fluid to a certain depth below the source, raises the other half an equal height above the source. This principle has been, with great success, applied to the lamp, we believe at first by the French, but has lately been brought to perfection by Mr. R. W. King, of *Holborn*, who manufactures these articles. *Figs. 1, 2, and 3, of Plate II.* explain the construction of this ingenious contrivance. *Figs. 1 and 3* are sections to which our description will principally apply; *A A* is a cylindrical vessel, divided by horizontal partitions into four chambers, *viz. B, C, D, and E*. The upper one, *B*, is to contain the oil which is for the immediate supply of the

flame; the next, *C*, is for the portion of oil which descends into the inferior chamber *E*, through the pipe *a*, and forces the contained air up through the pipe *b*, into the upper chamber *B*, and pressing upon the surface of the oil contained therein, causes it to ascend the pipe *d*, to the lamp *F*, which is on *Argand's* principle, and of the same construction as before explained; *e* is a pipe to conduct the external air down into the chamber *C*; and *f* is a pipe to convey the waste oil, which may drip down from the lamp, into the middle chamber *D*, which is merely a reservoir for such waste oil. *G* is a tube passing down to the second chamber *C*, to fill it with oil; it is closed at pleasure by an air-tight plug *h*, fitting into the end of it; the lower orifice of the pipe *a* is closed by a piece of hat *i*, acting as a valve, which is shut by a spiral spring beneath it, but opened by a wire passing down the tube *a*, and also through the filling tube *G*, the plug of which, when in its place, presses down the wire, and opens the valve: suppose the plug removed, the spring will close the valve *i*. Oil is now poured in at the end of the pipe *G*; it runs down into the chamber *C*, and fills it, then rises in the pipe, which having a hole in one side, near its upper end, the oil also flows into, and fills, the upper chamber *B*. The plug *h* is now inserted into its place; this shuts off the communication of the open air, both with the chambers *B* and *C*, but depressing the wire, as before explained, opens the valve *i*, and the oil in the middle chamber *C* descends, by its gravity, through *a*, as shewn by the arrow, and enters the lower chamber *E*, from which it expels the air by the pipe *b*, into the chamber *B*. The end of this pipe being covered by an inverted hood, the air ascends by bubbles, through the oil, into the top of the chamber, and pressing on the surface of the oil, forces it up the pipe *d*, to the lamp in which it stands at the level of the dotted line *k*, at which level it will evidently continue, till the upper chamber is exhausted, and the contents of *C* descended into *E*. The lamp is now replenished by the following means; the whole apparatus is inverted, as shewn in *fig. 3*; the oil now runs down the pipe *b*, and filling its hood, flows over into the upper chamber *B*, which it fills, the atmospheric air entering the pipe *e* into the chamber *C*, and thence by the pipe *a* into the chamber *E*, the air contained in the chamber *B* escaping at the pipe *d*. The lamp is held inverted for about a minute, and is then set upright. Fresh oil is now poured in at the plug *h*, to fill the second chamber *C*, and then the plug being put in, the above operation is repeated.

By this ingenious application of the principles of hydrostatics, the lamp *F* is constantly supplied with oil at precisely the same level, which does not vary by any diminution of the quantity of oil, or by the expansion of the air by heat, as in the fountain lamp, the included air being only applied as the medium to transmit the pressure of one column of oil, from *C* to *E* to act upon, and raise a similar column from *B* to the dotted line *k*. The lamp is furnished with a glass chimney *H*, similar to that before described, and for some purposes this is surrounded by a glass globe *K*, ground within-side to take off the glare of the light. The cylindrical vessel *A A* is included in an elegant columnar pedestal, shewn in *fig. 2*, where the ring *L* is that which is turned round to elevate the wick. *Fig. 4.* is a cap to cover the top, when the glass chimney is removed. The principal objection to this lamp, as originally constructed, was, that after inverting it, the oil would, in certain positions of the lamp, return down the pipe, and fill the lower chamber again, in which state it would not burn. Mr. King has completely remedied this, by bringing all the tubes, except the air and filling tubes, as near as possible into the centre of the lamp. Lamps of this

kind have been made to contain a sufficiency of oil to last two months, the vessel having the appearance of an elegant pedestal to ornament a hall or staircase.

A patent lamp, invented by John Barton, esq. is delineated in *fig. 5*, of our plate; it is contrived so as to always have a supply of oil maintained at a level, very near the point of combustion, by floating the oil upon a fluid of greater specific gravity. The oil is contained in a cylindrical vessel *A*, *fig. 5*, having a pipe, *B*, extending upwards from it to the burners at *a, a, a*, where the wicks are placed. The bottom of the vessel takes off with a screw joint similar to a snuff-box, that the inside of the vessel may be cleaned; and in the centre of the bottom is an aperture of about half an inch in diameter always open. This oil-vessel is immersed in a heavier fluid, contained within the external vessel *D E F G*. A float is attached to the oil-vessel at *H*, and another, in addition to it, is fixed to the tube *B* at *I*. In this situation of things, the column of heavy fluid, (which may be salt water,) from its surface at *c* to *d*, where the oil presses upon it, (through the hole in the bottom of the oil-vessel,) will support a column of oil, of a greater height, in proportion to the difference of their specific gravities, from *d* up to *e* for instance, within an inch of the burners *a, a*, which is a sufficiently small distance for the capillary attraction to draw up a supply of oil to the wick. As the oil diminishes by burning, the water enters the hole in the bottom of the oil-vessel, and still continues to support the column of oil, as at first, the oil-vessel floating in the water by the floats at *H* and *I*. By this means it is freed from the inconvenience we have before ascribed to Mr. Kier's lamp, because the burners descend as the oil is consumed; and therefore, though the oil is not maintained at the same identical level, yet, with respect to the burners, it is always at the same distance below their wicks. The external vessel unscrews at *F*, to get in the oil-vessel *A*. The enlarged part or vase *D*, at the top, should contain very nearly, but not quite, as much as the oil-vessel. In preparing the lamp, the external vessel is first filled with the water (poured in at the top of the vase *D*) as high as *E*: the oil-vessel is now full of water, and rests upon the bottom, because the upper float *I* is not supported. The oil, being poured in at the top of the tube *B*, expels the water from the vessel, and fills it at the same time, raising the water in the vase *D*, and floating the oil-vessel. In this state the lamp will continue, with the oil standing at *e*, until it is all consumed.

A very simple and efficacious lamp has been lately presented to the public, under the title of the Automaton lamp, having something ingenious in the manner of supplying it with oil. We have given three figures of it at *figs. 6, 7, 8*, of the last plate; it consists of a tin box, *abcd*, with a burner consisting of two wicks of cotton at *a*. The box is suspended upon pivots at *e*, entering eyes in the wire *f*, which is similar to the suspension part of a scale-beam. When this lamp is full of oil, which is poured in at *d*, it assumes the horizontal position *fig. 6*, because the mass of oil, *a b c d*, is chiefly situated behind the centre *e*, and balances the weight of the wick at *d*; but as the oil diminishes by burning, the weight behind the centre is lessened, whilst that of the wick continues without alteration. This occasions the lamp to librate, as in *figs. 7* and *8*, so that the oil is always kept very near the wick, by which means it will burn oil which is too impure for the capillary action of a common lamp. The nicety of its performance depends upon the figure of the vessel, and the place of the centre *e* corresponding with the weight of the tubes at *d*. This the makers have by experience determined to the greatest accuracy.

The Automaton lamp is in very general use in the north of England in cotton-mills, and other manufactories where the gas-lights are not introduced, which is undoubtedly the best method.

LAMP, *Cardan's*, is a contrivance of an author of that name, which furnishes itself with its own oil.

It consists of a little column of brass, tin, or the like, well closed every where, excepting a small aperture at bottom, in the middle of a little gullet or canal, where the wick is placed.

Here the oil cannot get out, but in proportion as it wastes, and so opens the passage of that little aperture.

This kind of lamp was much in use some years ago; but it has several inconveniences: such as that the air gets into it by starts and gluts; and that when the air in the cavity comes to be much rarefied by heat, it drives out too much oil, so as sometimes to extinguish the lamp.

Dr. Hooke, and Mr. Boyle, have invented other lamps that have all the conveniences of Cardan's without the inconveniences.

The flame in a lamp never consumes the wick, till the wick be exposed to the air by the flame's falling downward; and from thence it may be inferred, that a way found out to keep the fuel, and consequently the flame, at the same height upon the wick, would make it last a long time. Many ways have been devised to arrive at this, but it seems only possible to be done, in any degree of perfection, by hydrostatics. Thus, let a lamp be made two or three inches deep, with a pipe coming from the bottom almost as high as the top of the vessel; let it be filled so high with water, as to cover the hole of the pipe at the bottom, to the end that the oil may not get in at the pipe, and so be lost. Then let the oil be poured in, so as to fill the vessel almost brimful, which must have a cover, pierced with as many holes as there are wicks designed. When the vessel is thus filled, and the wicks are lighted, if water falls in by drops at the pipes, it will always keep the oil at the same height, or very near; the weight of the water being to that of the oil as 20<sup>3</sup> to 19, which in two or three inches makes no great difference. If the water runs faster than the oil wastes, it will only run over at the top of the pipe, and what does not run over will come under the oil, and keep it at the same height. *Phil. Trans. No. 245, p. 388.*

The access of air is of the greatest importance in every process of combustion. When a lamp is fitted up with a very slender wick, the flame is small and of a very brilliant white colour: if the wick be larger, the combustion is less perfect, and the flame is brown: a still larger wick not only exhibits a brown flame, but the lower internal part appears dark, and is occupied by a portion of volatilized matter, which does not become ignited until it has ascended towards the point. When the wick is either very large or very long, part of this matter escapes combustion, and shews itself in the form of coal or smoke. The different intensity of the ignition of flame, according to a greater or less supply of air; is remarkably seen by placing a lamp with a small wick beneath a shade of glass, not perfectly closed below, and more or less covered above. While the current of air through the glass shade is perfectly free, the flame is white; but in proportion as the aperture above is diminished, the flames become brown, long, wavering, and smoky; it instantly recovers its original whiteness when the opening is again enlarged. The inconvenience of a thick wick has been long since observed, and attempts have been made to remove it; in some instances by substituting a number of small wicks instead of a larger; and in others, by making

making the wick flat instead of cylindrical. The most scientific improvement of this kind is the lamp of Argand, described in the preceding part of this article. In this the wick forms a hollow cylinder or tube, which slides over another tube of metal, so as to afford an adjustment with regard to its length: when this wick is lighted, the flame itself has the figure of a thin tube, to the inner as well as the outer surface of which the air has access from below. And a cylindrical shade of glass serves to keep the flame steady, and in a certain degree to accelerate the current of air. The inconvenience of a long wick, which supplies more oil than the volume of flame is capable of burning, and which consequently emits smoke, is seen at once by raising the wick; and on the other hand, the effect of a short wick, which affords a diminutive flame merely for want of a sufficient supply of combustible matter, is observable by the contrary process. The most obvious inconvenience of lamps in general, arises from the fluidity of the combustible material, which requires a vessel adapted to contain it, and even in the best constructed lamps is more or less liable to be spilled. When the wick of a lamp is once adjusted as to its length, the flame continues nearly in the same state for a very considerable time. Nicholson's Journal, vol. i. 410.

By 17 Geo. II. cap. 29. a convenient number of glass lamps shall be put in such places of the city of London, as the mayor, aldermen, and commonalty shall think fit; to be kept lighted and burning from sun set to sun-rising throughout the year; and rates shall be made not exceeding 6d. in the pound, nor above 50s. a year on any one person, for defraying the charges of them. Every alderman, with consent of his deputy and common council, may contract yearly for the setting up lamps, and their lighting, trimming, &c. and persons maliciously breaking down or extinguishing the lamp, shall forfeit 40s. for the first offence; 50s. for the second; and 3*l*. for the third, leviable by justices, or to be sent to the house of correction. By stat. 11 Geo. III. c. 29. for paving and lighting London, the wilfully breaking or extinguishing of any lamp incurs the penalty of 20s. for each lamp or light destroyed or extinguished. None but British oil is to be used for lamps in private houses, under penalty of 40s. 8 Ann. cap. 9.

The use of lighted lamps in churches, and places of devotion, is very ancient. In the city of Fez is a mosque, wherein are 900 brazen lamps burning every night. In Turkey, all the illuminations are made only with lamps. Polydore Virgil ascribes the first invention of lamps to the Egyptians; and Herodotus describes a feast of lamps held annually in Egypt.

Kircher shews the manner of preparing lamps, which shall diffuse a light so disposed, as to make the faces of those present appear black, blue, red, or of any other colour.

There has been a great dispute among the learned about the sepulchral lamps of the ancients: some maintain, they had the secret of making lamps that were inextinguishable, alleging several that have been found burning, at the opening of tombs fifteen or sixteen hundred years old. But others treat these relations as fables; and others think, that the lamps, which were before extinguished, took light afresh upon the admission of fresh air.

Dr. Plott, however, is of opinion, such perpetual lamps are things practicable, and has himself made some proposals of this kind. The lium abetlinum, he thinks, may do pretty well for the wick, and that the naphtha, or liquid bitumen, constantly springing into some of the coal-mines, would answer for the oil.

If the asbestos will not make a perpetual wick, he thinks

there is no matter in the world that will; and argues, that the tradition of fuel lamps must be fabulous, or else that they made them without wicks.

Such a lamp he thinks it possible to make of the bitumen springing into the coal-mines at Pitchford, in Shropshire; which, he says, like other liquid bitumen, will burn without a wick.

Those lamps that kindle on the immision of fresh air, the same author thinks, might be imitated by inclosing some of the liquid phosphorus in the recipient of an air-pump; which, under those circumstances, will not shine at all; but on letting the air into the recipient, there will possibly, says he, appear as good a perpetual lamp as some that have been found in the sepulchres of the ancients.

LAMP, *Rolling*, in *Mechanics*, is a Lamp A B (*Plate I. Lamps. fig. 7.*) that has within it the two moveable circles D E and F G, whose common centre of motion is at K, where their axes of motion cross one another, in which point also is their common centre of gravity. If to the inward circle you join within the lamp K C, made pretty heavy, and moveable about its axis H I, whose centre of gravity is at C, the common centre of gravity of the whole machine will fall between K and C, and by reason of the pivots A, B, D, E, H, I, will be always at liberty to descend; and, therefore, let the whole lamp be rolled along the ground, or moved in any manner, the flame will always be uppermost, and the oil cannot be spilt. In this manner the compass is hung at sea; and thus should all the moon-lanterns be made that are carried upon a pole before coaches or carriages which travel in the night. *Desag. Exp. Phil.* vol. i. p. 57.

LAMP-black. Of this kind there are two sorts; one of which is the light foot, obtained from burning pine and other resinous wood; and another, which is the heavy black, obtained by calcining bones in close vessels. See BLACK. See also BONE and CHARCOAL.

LAMP-blowers are persons who form various articles of glass for toys, and for more important philosophical purposes, from tubes, &c. by means of the *blow-pipe*; which see.

The apparatus of these artists consists of a solid table, to the bottom of which is fixed a double bellows with a foot-board, from which proceeds a pipe that conducts the blast to the lamp. This lamp is a large bundle of cotton threads, placed in a tin vessel in the shape of a horse-shoe, and supplied by lumps of tallow deposited by it, and pushed into the flame as the continued combustion requires. The smoke is conveyed away by a small chimney suspended over the lamp. The blast-pipe in front of the table, at which the artist is seated, drives the jet of flame away from him, so that he suffers no inconvenience from it.

The other articles of his apparatus are glass tubes of various dimensions, and two or three very simple iron tools, such as a small forceps, files, &c. The flame in full vigour is about four inches in length, which near its extremity is of a clear light blue, when it is the hottest, and beyond of a pale yellow. The tubes, before the operation commences, are well dried, so as to be quite free from moisture. They are then gradually heated by being first held in the flame of the lamp without blowing, and then at the edge of the outer yellow part of the jet of flame, and slowly brought to a state of fusion. The flame is sufficiently strong to bring to a very white-red heat a solid mass of glass, about the size of a playing marble, or even larger; and this, when blown out very thin, will make a bulb of the capacity of three ounces, which is nearly the extent of the power of the common lamp-blowing. The bulbs for thermometers and other philosophical

lofophical purposes are much lefs. (Aikin's Dict. vol. i. art. *Glaſt*.) For an account of the operation of hermetical fealing, performed by the lamp-blowers, fee HERMETICAL *Sealing*. For bending and joining glaſs-tubes, forming bulbs to tubes, and ſpinning out glaſs-threads, fee TUBE, THERMOMETER, and THERMADS.

LAMP FURNACE, is a furnace, in which the heat is produced and maintained by the flame of a lamp introduced within it. This furnace has no occasion for an aſh-hole, a grate, or a fire-place. It has only one opening below, through which the lamp is introduced, and a kind of ſmall chimney in its upper and lateral part, for circulation of air, to keep up the flame of the lamp, and to give vent to the ſmoke. For the deſcription of an improved furnace of this kind, fee Lewis's Com. Phil. Techn. p. 29. See FURNACE.

LAMPÁ, in *Geography*, a town of Chili, ſituated on a lake; 20 miles N. of Valparaiſo.—Alſo, a town of Peru, and capital of a juriſdiction of the ſame name, in the biſhopric of Cuſco, 90 miles S. of Cuſco. The ſoil is partly fertile and partly unproductive: the vicinity abounds with ſilver mines. S. lat. 14° 55'. W. long. 81° 44'.

LAMPACAN, a ſmall iſland in the Eaſt Indian ſea, a little S. of Junkfeilon.

LAMPADARIUS, EMANUEL, in *Biography*, an author who adorned the muſic of the Greek church. “De Pfallicis arte, et iſtius et aliorum Poemata Ecclēſiaſtica, ad notas Muſica accomodata.” The Abbatte Martini of Venice, to whom we have aſſigned an article, found this book, and made extracts from it, in Greece; but we never met with it in any public library, either at home or on the continent, except the royal library at Turin. The title of the Greek treatiſe, by Lampadarius, is the following: “Τραχολογία τῆς μουſικῆς τέχνης.” The extract from it by the Abbatte Martini, which is in our poſſeſſion, is too long for inferſion here, nor would it be of much uſe could we allow it room, as no equivalents to the Greek characters are given in modern notation; but with reſpect to the author, we find among the memoranda made in the king of Sardinia's library at Turin, in 1770, an account of a Greek MS. of the 15th century, No. 353. b. i. 24. in which Lampadarius is often mentioned as author of the muſic to the hymns and prayers it contains. Fabricius, likewiſe, Bibl. Græc. vol. ii. p. 269. 564. and 586, ſpeaks of a MS. in the Selden Collection at Oxford, and another in the Jeſuits' library at Louvain, in which there are explanations of the notes uſed by the modern Greeks, and muſical compoſitions by ſeveral authors, particularly Lampadarius.

LAMPADARY, LAMPADABUS, an officer in the ancient church of Conſtantinople, whoſe buſineſs was to ſee the church well lighted, and to bear a taper before the emperor, the emperreſs, and the patriarch, when they went to church, or in proceſſion. The taper borne by the lampadary before the emperor was emcompaſſed with divers circles of gold, in manner of crowns; thoſe held before the emperreſs and patriarch had but one. It ſeems they were of emblematical uſe, and were intended to keep thoſe great perſons in mind, that their light was to illumine thoſe in inferior ſtations.

There were alſo lampadaries in the emperor's palaces; and others in the houſes of the grandees. At firſt, the privilege of having a lampadary, or torch-bearer, was only granted to the principal officers of the crown, and the chief magiſtrates; but afterwards the emperor allowed it to other inferior officers, as queſtors, treaſurers, &c. They alſo bore before the magiſtrates the emperor's image, &c. And it was probably on account of this image, that they were firſt permitted to have a lampadary.

LAMPADIAS is uſed by ſome authors for a kind of bearded comet, which, as they pretend, reſembles a burning lamp, being of ſeveral ſhapes; its flame or blaze tapering upward ſometimes like unto a ſword, and being at other times double or triple pointed.

LAMPADIUS, in *Biography*, a chanor of the church at Luneberg, published a ſmall work in Latin, intitled “Compendium Muſicæ,” 12mo. 1537. This ſhort tract, which is in dialogue, and a kind of muſical catechiſm deſigned for incipiens, has, at the end, a few ſhort rules for compoſition, with examples.

LAMPAS, or LAMPERS, a kind of ſwelling in the palate of a horſe; ſo called, becauſe it is cured by burning with a lamp, or a hot iron; and ariſing from abundance of blood reſorting to the firſt furrow of the mouth, near the fore-teeth, which cauſes that furrow to ſwell as high as his gatherrers; it hinders the beaſt's feeding, and makes him let his meat fall, half chewed, out of his mouth.

LAMPASKE, in *Geography*, a town of Pruffia, in Na-tangen; 20 miles S.E. of Konigberg.

LAMPE, FREDERICUS ADOLPHUS, in *Biography*, pallor of St. Stephen's church in Bremen, became an antiquary at 15 years of age; and in 1703 published, in 12mo., a work of great learning and reſearch, intitled “De Cymbalis veterum, Libri tres, in quibus quæcunque ad eorum Nomina, Differentiam, Originem, Hiſtoriam, Miniſtros, Ritus pertinent, elucidantur, cum Figuris æreis Trajecti ad Rhenum,” 1703.

This author, in a way ſimilar to Bartholinus, in treating of the flutes of the ancients, has given us all the information which could be gleaned from antiquity on the ſubject of the cymbal, which is hardly a muſical inſtrument, but rather a chronometer to meaſure and mark the time, in its military uſe. In its religious employment, indeed, before large bells were caſt, it ſerved both Pagans and Chriſtians as a ſignal and call to temple worſhip. Its clashing tone in the field may regulate the ſteps of the ſoldiery in their march; but even this purpoſe ſeems better performed in China by the gong and *pierre ſonore*, or muſical ſtone, uſed in proceſſions, as well as in the army: for theſe have real muſical tones, to which there is no difficulty in tuning other inſtruments. Our author, by his claſſical knowledge and diligence, has nearly found as many names in ancient authors for the different kinds of cymbals, as the Perſian language furniſhes for a horſe or lion. As nothing on the ſubject has eſcaped the notice of the author, this little book will be found to contain much precious information for a claſſical antiquary in muſic. Its learned author died of a hæmorrhage at Bremen, in 1729, at the age of 46.

LAMPE, JOHN FREDERIC, a Saxon, who arrived in England about the year 1726, began firſt to be noticed as a compoſer about the year 1732. On the 25th of February of that year, the following paragraph was inferſed in the “Daily Poſt.” “We hear that there is a ſubſcription for a new English opera, called “Amelia,” which will ſhortly be performed at the new theatre in the Haymarket, by a ſet of performers who never yet appeared in public.” This opera, written by Harry Carey, and ſet to muſic by Lampe, was firſt performed March 15th, 1732; in the principal character of which, Miſs Arne, afterwards ſo celebrated as a tragic actreſs, by the name of Mrs. Cibber, firſt appeared on the ſtage as a ſinger. The muſic, which, according to the advertisement, was ſet in the Italian manner, having been much applauded, was ſoon avowed by Lampe; and Miſs Arne's performance intereſted every hearer. The year

year 1737 was rendered memorable at Covent-Garden theatre by the success of the burlesque opera of the "Dragon of Wantley," written by Carey, and set by Lampe, "after the Italian manner." This excellent piece of humour had run twenty-two nights, when it was stopped, with all other public amusements, by the death of her majesty queen Caroline, November 20th; but was resumed again on the opening of the theatres in January following, and supported as many representations as the "Beggar's Opera" had done, ten years before. And if Gay's original intention in writing his musical drama was to ridicule the opera, the execution of his plan was not so happy as that of Carey; in which the mock heroic, tuneful moniter, recitative, splendid habits, and style of music, all conspired to remind the audience of what they had seen and heard at the lyric theatre, more effectually than the most vulgar street tunes could do; and much more innocently than the tricks and transractions of the most abandoned thieves and prostitutes. Lampe's music to this farcical drama was not only excellent fifty years ago, but is still modern and in good taste.

In 1741, his wife, (the second daughter of Charles Young, sister to Mrs. Arne,) with Miss Young, Sullivan, the two Messings, and Jenny Worfdale, went to Preston Guild, and afterwards to Chelster, where they performed the "Dragon of Wantley," "Margery," the "Sequel to the Dragon of Wantley," &c. all composed by Lampe. He set "Nancy, or the parting Lover," "Pyramus and Thisbe," which had great success; and published, in an octavo volume, a tract, intitled "The Art of Music," in 1740. But in 1737 he had published a treatise, under the title of "A plain and compendious Method of teaching Thorough-Bass," &c. 4to.; a work of great merit, and the first in our language, by which a student can profit much without a master, as the chords, engraved on copper-plates, are all placed over the figured bass, and the examples transposed into different keys.

Lampe was a truly ingenious man, well versed in the theory of the art, with a most happy turn for humour, without buffoonery, in his comic operas; and, moreover, a man of probity, with great simplicity of manners, and possessed of a kind and benevolent heart. This excellent musician and worthy man, quitting London, with his family, in 1748, resided two years in Dublin; and in 1750 went to Edinburgh, where he was settled very much to the satisfaction of the patrons of music in that city, and of himself; but in July 1751, he was seized with a fever, which put an end to his existence at the age of fifty-nine.

LAMPE, in *Geography*, a town of Sweden, in the government of Wafra; 28 miles E. of Gamla Karleby.

LAMPEDOSA, an uninhabited but pleasant and fertile island in the Mediterranean. The Catholics and Mahometans visit a building upon it, which is divided into a church and a mosque. Near it is a magazine, containing the deposits of the visitants, which are taken up by some Sicilian monks, and applied to the hospital at Trapani. The island is about 12 miles in circumference, has a good port, is well supplied with fresh water, and has, on the coast, an excellent fishery; 63 miles W. of Malta. N. lat. 35° 40'. E. long. 12° 24'.

LAMPERN, in *Ichthyology*, a river fish, being the petromyzon branchialis of Linnæus, found in many parts of England, particularly in Oxfordshire, and the neighbouring counties, and there called the *pride of the Iffs*. The Latin authors call it the lampetra minima and muscula fluviatilis. See PETROMYZON Branchialis.

The word lampern is used by the common people in Eng-

land for one species of the lampetra, and is not to be confounded with the other called the lamprey, or the lamprey-eel. See PETROMYZON.

No lamperns are to be taken in the river Thames and Medway, except from August 24 to March 30. 30 Geo. II. cap. 21.

LAMPETER, in *Geography*, a township of America, in Lancaster county, Pennsylvania, containing 2028 inhabitants.

LAMPETER. See LLANBEDER.

LAMPETIA, in *Ancient Geography*, a town of Italy, in Magna Græcia, in the country of the Brutii.

LAMPETIANS, LAMPETIANI, in *Ecclesiastical History*, a sect of ancient heretics, in the seventh century, who fell in with some of the opinions of the Aerians.

Their founder, Lampetius, is said to have been one of the chief of the Marcionites. They condemned all kinds of vows, particularly that of obedience, as inconsistent with the liberty of the sons of God.

LAMPETRA, LAMPREY, à *lambendo petras*, because this species is supposed to lick the rocks, in *Ichthyology*, belongs, in the Artedean and Linnæan systems, to the genus of petromyzon. See PETROMYZON Marinus.

This is a fish that equally lives in salt and fresh water. In the month of March it commonly runs up into the rivers, and is then most valuable for the table, as being fat and full of eggs; so that the best season for lampreys is in the months of March, April, and May, because they are most firm when they first leave the salt water, and become wast and flabby at the approach of hot weather; they are found in several of our rivers, but the Severn is the most noted for them. They are taken in nets along with salmon and shad, and sometimes in weels laid in the bottom of the river. It has been an old custom for the city of Gloucester, annually, to present his majesty with a lamprey pyc, covered with a large raised crust; and as the gift is made at Christmas, the corporation procure fresh lampreys at that time with great difficulty. They are reckoned a great delicacy, either potted or stewed; but are a surfeiting food, as one of our monarchs fatally experienced, Henry the First's death being occasioned by a too full meal of this fish. They are sometimes found so large as to weigh four or five pounds. The lesser lamprey, or petromyzon fluviatilis of Linnæus, sometimes grows to the length of ten inches. These are found in the Thames, Severn, and Dee, and are potted with the large species, and are reckoned of a milder taste. They are sold to the Dutch as bait for their cod-fishery. Above 450,000 have been sold in a season at 40s. per thousand. Of late, above 100,000 have been sent to Harwich for the same purpose. It is said the Dutch have the secret of preserving them till the turbot fishery. Another species is the *lampetra*, which see.

LAMPETRA Indica, the name of an East Indian fish of the lamprey kind, caught in standing waters, and called by the Dutch there *bont ael*, and *neegen oog*, or *nine eyes*.

LAMPI, in *Geography*, a district or country of Guinea, governed by a king, subject to Aquambo.

LAMPICHELEON, a town of Hindoostan, in the circar of Adoni; 10 miles E. of Candanore.

LAMPIS, a town of Sweden, in Tavastland; 25 miles E. of Tavasthus.

LAMPO, a town on the west coast of Celebes. S. lat. 3° 55'. E. long. 120° 4'.

LAMPOCARYA, in *Botany*, so denominised by Mr. Robert Brown, from *λαμπε*, to *shine*, and *καρυον*, a *nut*, or any fruit with a hard shell, alluding to the hard and polished seeds.—Brown. Prodr. Nov. Holl. v. 1. 238.—Clafs and order,

order, *Tetrandria Monogynia*. Nat. Ord. *Calamariæ*, Linn.  
*Cyperoides*, Juss.

Eff. Ch. Spikelets imbricated on all sides, single-flowered, the outer scales being empty. Stamens four, sometimes three or six, with permanent elongated filaments. Style awl-shaped, three-cleft. Stigmas undivided. Nut boay, shining, pointed with the permanent base of the style, its shell thickened upwards; the kernel smooth.

Obf. This genus is intermediate between *Cladium* of Browne's Jamaica, and *Gabnia* of Forster, differing from the former in having the filaments elongated after flowering, and a sharp-pointed nut; from the latter in having a smooth or even kernel. *Gabnia jebanoides* of Forster appears, by a specimen in the Bankian herbarium, to be a *Lampocarya*.

1. *L. aspera*. Stamens four. Spike compound, leafy; the partial ones feacely divided. Spikelets clustered. Inner scales obtuse, smooth.—Gathered by Mr. Brown near Port Jackson, as well as in the tropical part of New Holland. The four stamens are a very unusual number in this family.

2. *L. hexandra*. (*Gabnia trifida*; La Billard. Nov. Holl. v. 1. 89. t. 116.)—Stamens six. Panicle close; branches slightly divided. Spikelets collected into round heads. Scales all sharp-pointed.—Gathered by La Billardiere in Van Diemen's land. The stems are two feet high, round, leafy, smooth. Leaves sheathing, awl-shaped, long, and slender. Panicle slender, erect, composed of several stalked heads of flowers, with two or three lanceolate bractees at the base of each. Mr. Brown doubts whether this second species be properly referred to the genus in question. We should be much inclined to reduce both of them to *Gabnia*.

LAMPOL, in *Geography*, a town of Poland, in the palatinate of Braclaw, near the Dniefler; 56 miles S.S.W. of Braclaw.

LAMPON, in *Biography*, a performer on the cithara, who taught Socrates music in his old age, and who sung at a festival which Xenophon gave to the philosophers. Socrates tells us, that he only began to compose verses, after he was imprisoned, on account of the many dreams, in which he was advised to attach himself to music; believing that it was impossible to arrive at one without the other.

He composed hymns in praise of Apollo, and let them to music; but he was put to death some days after. Others tell us, that Damon was the music-master of Socrates. See DAMON.

LAMPON, or *Lampoon*, in *Geography*, a country of Sumatra, which is a portion of the southern extremity of the island, beginning, on the west coast, at the river of Padang-goochie, dividing it from Passumnah, and extending across as far as Palembang, on the north-east side, at which last place the settlers are mostly Javans. On the south and east sides it is washed by the sea, having several ports in the straits of Sunda, particularly Keyfen and Lampon bays; and the great river *Toolang-bouang* runs through the heart of it, rising from a considerable lake between the ranges of mountains. That division of Lampon, which is included by Padang-goochie and a place called Nassall, is distinguished by the name of *Briaran*; and from thence fourthward to Flat-point, by that of *Laout-cacour*, although *Cacour*, properly so called, lies in the northern division. The country of Lampon is best inhabited in the central and mountainous parts, where the people live independent, and in some measure secure from the inroads of their eastern neighbours, the Javans, who, from about Palembang and the straits, frequently attempt to molest them. If you ask the Lampon people of these parts, whence they originally

came? they answer, from the hills, and point out an inland place near the great lake, whence, they say, their forefathers emigrated. These, of all the Sumatrans, have the strongest resemblance to the Chinese, particularly in the roundness of face, and construction of the eyes. They are also the fairest people of the island; and the women are the tallest, and esteemed the most handsome. Their language differs considerably from that of the *Rejangs*, and they use characters peculiar to themselves. The titles of government are *Pangaran* (from the Javans), *Carceoo*, and *Kiddinang* or *Nelchee*; the latter answering nearly to *Dusatty* among the *Rejangs*. The district of *Crooe*, near mount Poogeng, is governed by five magistrates, called *Pangoro-lemo*, and a sixth, superior, called by way of eminence *Pangoro*; but their authority is said to be usurped, and often disputed. The word, in common, signifies a gladiator, or prize-fighter. The *Pangaran* of *Soko* in the hills is computed to have four or five thousand dependants; and sometimes, on going a journey, he levies a *talle*, or eighth part of a dollar, on each family; which shews that his government is more arbitrary, and more strictly feudal, than among the *Rejangs*, where the government is rather patriarchal. The Javanele banditti often advance into the country, and make depredations upon the inhabitants, who are not, in general, a match for them. They do not use fire-arms, though in the northern part of the island they are manufactured. Beside the common weapon of the country, they fight with a long lance, carried by three men; the foremost guiding the point, and covering himself and his companions with a large shield. Inland of *Samanki*, in the straits of Sunda, there is a district, as the Lampons say, inhabited by a ferocious people, who are a terror to the neighbouring country. Their mode of atoning for offences against their own community is by bringing to their doosoon the heads of strangers. These reports, however, depend on the credibility of a people who are fond of the marvellous, and addicted to exaggeration. The manners of the Lampons are more free, or rather licentious, than those of any other native Sumatrans. An extraordinary liberty of intercourse is allowed between the young people of different sexes, and the loss of female chastity is not a very uncommon consequence. Both men and women await themselves before company, when they prepare to dance; the women their necks and arms, and the men their breasts. They also paint each others' faces, making fantastic spots with the finger on the forehead, temples, and cheeks, of white, red, yellow, and other hues. In every doosoon there is appointed a youth, well fitted by nature and education for the office, who acts as master of the ceremonies, regulating every circumstance that pertains to the dances and the assembly. The Lampons eat almost all kinds of flesh indiscriminately; and their goolies (curries or made dishes) are said by connoisseurs to have no flavour. They entertain strangers with greater profusion than any that is met with in the rest of the island. One man has been known to entertain a person of rank and his suite for sixteen days, during which time there were not less than 100 dishes of rice spread each day. Their dishes of china or earthen ware are very costly, being valued at 40 dollars a-piece. The terms of the *joosoor*, or equivalent for wives, is here the same nearly as with the *Rejangs*. The father of the girl never admits of the *poosoo talle kooloo*, or whole sum being paid; and thus withholds from the husband, in every case, the right of selling his wife, who, in the event of a divorce, returns to her relations. Where the *poosoo talle* is allowed, he has a property in her little differing from that of a slave. The value of the maiden's golden trinkets is nicely estimated, and her *joosoor* regulated according to that, and the rank of her

her parents. The fines and compensation for murder are, in every respect, the same as in other countries of the island. The Mahometan religion has made considerable progress among the Lampoons, and most of their villages were mosques; nevertheless, an attachment to the original superstition of the country induces them to regard with particular veneration the *crammats*, or burying-places of their fathers, which they pliously adorn, and cover in from the weather. The Dutch have a resident here. S. lat. 5° 40'. E. long. 105° 15'. Marfden's Sumatra.

LAMPON Bay, a bay on the east coast of the island of Luzon. N. lat. 14° 45'. E. long. 122° 14'.

LAMPREY, BLIND. See EINBLINDER and PETROMYZON *branchialis*.

LAMPRIDIO, BENEDICT, in *Biography*, a distinguished Latin poet, who flourished at the commencement of the sixteenth century, was born at Cremona. He went to Rome in his youth, and was first domesticated with Paul Cotesi. He then became a teacher in the Greek college, instituted by John Lascaris, in the pontificate of Leo X. After this he went to Padua, and was employed many years as private teacher of the learned languages, and much esteemed by persons of eminence. He was afterwards appointed, with a liberal salary, to undertake the education of the son of the duke of Mantua. Lampridio died in the year 1540: he is known as an author by his Greek and Latin poems, consisting of epigrams and odes; in the latter he was an imitator of Pindar. There are extant three Italian letters written by him to cardinal Bembo, and one to cardinal Pole. An edition of his Latin poems, together with those of J. Bapt. Amaltheus, was printed at Venice in 1550.

LAMPRIIDIUS ÆLIUS, was a Roman historian in the fourth century under Dioclesian and Constantine. He is supposed to have been the author of the lives of Commodus, Antoninus, Diadumenus, Heliogabalus, and Alexander Severus. The style and arrangement of Lampridius will not allow him a place among historians of the superior class, but he is valuable for his facts. His lives make a part of the "Historiæ Augustæ Scriptores." Moreri.

LAMPRIILLON, or LAMPRELON, a name by which some authors have called the particular species of lamprey, which we, by way of distinction, call *lamperna*.

LAMPROPHORUS, an appellation anciently given to the neophytes, during the seven days that succeeded their baptism.

In the ceremony of baptism, the new Christian was clothed with a white robe, which he wore for the week following; and was thence called *lamprophorus*, which signifies a person wearing a shining garment; from λαμπροσ, shining, and φορο, I bear.

The Greeks also gave this name to the day of the resurrection, because their houses were adorned and illuminated on that day with a great number of torches, as a symbol of the light which that mystery diffused in the world.

LAMPUSACUS, in *Ancient Geography*, a town of Asia, on the banks of the Hellespont, more anciently called *Pityoufa*, which was founded by the Phocæans. The object of worship in this place was Priapus, the god of the gardens. This town rose from the ruins of Pæfos, whose inhabitants established themselves here. Its territory was fertile; and it was assigned by Artaxerxes to Themistocles, in order to furnish his table with wine.

LAMPUSAKI, in *Geography*, a town of Natolia, celebrated for its wine, anciently *Lampusacus*; 40 miles W. of Artaki. N. lat. 40° 20'. E. long. 26° 44'.

LAMPSAMANDUS, in *Ancient Geography*, a small

island of Asia, on the coast of Caria, in the Ceramic gulf. Pliny.

LAMPUSANA, in *Botany*. See LAPSANA.

LAMPUGA, in *Ichthyology*, a name given by some authors to the fish more usually known by the name of *Bromateus*.

LAMPUGNANI, JOHN BAPTIST, in *Biography*, of Milan, an opera composer of great fancy and spirit. He was not a deep contrapuntist, but there was a certain gaiety and spirit in his style, which amused his hearers and engaged attention. He came into England in 1742, during the regency of lord Middlesex, and while Monticelli was the chief singer, for whom he composed some very captivating airs. The English, long accustomed to a more solid, grave, and learned style, thought him inaccurate, wild, and frivolous, and his style was only tasted by such of our nobility and gentry as had been in Italy, and had been initiated into the new opera style. The character of this composer is drawn with so much judgment, taste, and discrimination in M. Laborde's "Essai for la Musique," and so exempt from the national prejudices with which that work abounds, that we shall venture to translate it, and guess at the name of the author.

"Lampugnani was a professor much esteemed among the moderns. He excelled much in his melodies, and owed more to nature than to study. He applied with great perseverance to produce new effects from instruments. Consequently to him has been ascribed the new manner of using the opera orchestra. Instrumental music, and its performers, have doubtless greatly increased their importance by this innovation. But, how has it been abused! It sometimes happens, that the noise of the orchestra is all that can be heard, from the beginning of the opera to the end. And that a beautiful passage can only now and then penetrate through the instrumental phalanx, to convince us that a voice has any concern in the business. There are certain composers, who have no resource but in noise. There are others, likewise, who have no time allowed them for any thing else." Voiture, in one of his letters, begs pardon of a friend for writing him so long a letter, as he has not time to write a shorter. But in Italy, an opera must be composed in a fortnight, so that the composer loads his instruments as much as he can, and leaves the voices at full liberty to do nothing, or to do as much as they please. In the operas of Lampugnani, the voice governs the orchestra, and upon her all the instruments wait, as on a superior. He is author of a great number of works, that have had complete success in Italy; but it is in vain to name them, as music of more than a year old, is as difficult to be found as a coin of the emperor Otho.

We saw Lampugnani at Milan, nearly thirty years after he had been in England, where, as a composer, he was laid on the shelf. He taught ladies to sing, and had gained great credit from some of his scholars. He resided constantly in that city, where he played the first harpsichord at the opera, in the absence of the composer, and arranged the passiccios. He was a pleasant old man, with the spirits and good nature of a young one.

LAMPUGO, in *Ichthyology*, a name given by many to the *hippurus*, a sea fish, caught on the coast of Spain. See CORYPHÆNA.

LAMPYRIS, in *Entomology*, a genus of the coleoptera order. The most familiar species of this kind, and which may be considered as an instructive example of the genus in general, is that known in our own language by the name of glow-worm, and in other counties by names of similar tendency, the female being destitute of wings, the body elongated,

gated, and the posterior part beneath emitting, during the night time, a brilliant phosphoric light. The species of this genus are rather numerous; the greater part are natives of Africa and America; a few only inhabit Europe, and of these but three kinds are found in Britain, two of which are rare.

The females of the species most commonly known are destitute of wings; all the lamproyrides of the latter sex shine during the obscurity of the evening, or at night, and some of the males possess the same ability, while others are in this respect deficient. The males throughout all the species are furnished with wings; the females, on the contrary, are always apterous. The luminous property in the lamproyris tribe resides in the two or three posterior rings of the abdomen, and is only visible on the under surface. In the day time the luminous space appears paler, and more inclining to yellow than the rest of the insect: the light, when emitted, partakes of various hues, being either a clear brilliant white, or white tinged with greenish or blueish, and this it can vary or heighten in brilliancy at pleasure, as it does not depend on any external cause: it is an inherent ability, governed only by the will or caprice of its possessor, and, according to the general persuasion of naturalists, is an ordinance of nature, by means of which the males, in their excursions through the air, can readily discover their apterous crawling mates among the grass and herbage beneath them.

This luminous appearance of the glow-worm has at various periods excited considerable curiosity in the minds of speculative men. Forster first announced that this extraordinary property was so strong and retentive, that he could distinctly read by the light emitted from glow-worms plunged into oxygen gas. The same experiment was verified by Beckerhiem, who proved besides that they live a long time in other kinds of gas, and continued to shed their light vigorously, as in the oxygen gas. With the acid, the nitrous, muriatic, and sulphurous gases, he did not however succeed so well; when placed in either of these, the insects died in a few minutes. A variety of other experiments have been made on the lamproyrides by Spallanzani, Carradori, and others, the result of which proves, among other curious circumstances, that this luminous property is inherent. These insects were observed to possess the power of moving various portions of the viscera, independently of the others; and it was likewise ascertained that a portion of the luminous rings of the abdomen, when cut out of the insect, retained its brilliant appearance for some seconds afterwards. These experiments were made chiefly on the *L. italica*, the luminous properties of which are more conspicuously brilliant even than that of our common glow-worm.

The lamproyrides are found most commonly about the months of June and July, appearing among the bushes, the grass and herbage on the skirts of lanes leading through meadows, and woody situations. The males of some kinds, as before intimated, are luminous; and these, when on the wing during the night time, exhibit a most lively and splendid aspect, like so many sparks of fire darting through the air. The females nearly resemble the larvæ, being of a lengthened form, divided into a number of distinct segments, the head scaly, and the anterior part of the body furnished with six scaly feet. The larvæ feed on leaves. The eggs, which are numerous, are usually deposited near the roots of grass.

Among the ancients, the names lamproyris, noctiluca, cicindela, &c. were bestowed, without discrimination, on almost every creature of the insect tribe, possessing the luminous property of the glow-worm. Geoffroy endeavoured to unite the lamproyrides together, but with these he confounded some other genera. Linnæus also blended them with the

lycus and pyrochroa; and Schæffer followed Geoffroy. Fabricius has adopted the lamproyris genus, with some material deviations from either, and his authority is, in this respect, rather generally approved. Linnæus, so lately as the 10th edition of Syst. Nat. confounds the lamproyrides under the genus cantharis; it is in a subsequent edition they appear under the name of lamproyris, with the following essential character. Antennæ filiform; wing-cases weak and flexible; thorax flat, semi-orbicular, surrounding and concealing the head; segments of the abdomen terminating in folded papillæ; females in general destitute of wings. This is the character admitted by Gmelin, who, besides the true lamproyrides, by this means includes the genera omalyfus of Geoffroy, collyphus of Olivier, pyrochroa of Geoffroy and Fabricius, and the lycus of Olivier and most other modern authors. The Fabrician character of the lamproyris genus consists in having four sub-clavated feelers; jaw bifid; lip horny and entire; antennæ filiform.

## Species.

**NOCTILUCA.** Oblong, brown, shield cinereous. Linn. *Cantharis noctiluca*, Fn. Succ. *Glow-worm*, Donov. Br. Inf. &c.

Frequent in meadows, and near woods in Europe: the female is rather larger than the male.

**SPLENDIDULA.** Oblong, brown; shield hyaline at the tip above the eyes. Mark. Ent. Brit. *Lamproyris splendidula*, Linn. Donov. Br. Inf. *Cantharis noctiluca*, Scop. *Le ver luisant à femelle sans ailes*, Geoffr.

"An European species, very rarely found in Britain; the specimens recorded (in Brit. Inf.) were received by Mr. Drury from Yorkshire, and are preserved in his cabinet now in our possession. It resembles the common glow-worm in size and appearance, but is distinguished from that insect principally by the hyaline spot at the anterior apex of the shield above the eyes." This kind is observed by Fabricius to be most replendent in showery weather.

**CORRUSCA.** Dull black; shield with a rosy crescent each side. Linn.

Inhabits North America. Fabricius speaks of a variety twice the ordinary size.

**OBSCURA.** Black; shield with a rufous spot each side. Fabr.

Described from a specimen in the Banksian cabinet, a native of Terra del Fuego. The shield is entire, and depressed at the sides; wing-cases brown and without spots; abdomen and legs black.

**LATICORNIS.** Ovate, black; shield with rufous margin; antennæ compressed. Fabr., Olivier, &c.

A species of moderate size; the shield rounded; wing-cases somewhat striated; abdomen with two or three white pellucid dots on the left segment.

**PYRALIS.** Shield rufous; in the middle black; wing-cases black, the edges with the abdomen white. Linn. Native of South America.

**CINCTA.** Fuscous; thorax, edge of the wing-cases, and tip of the abdomen fulvous. Olivier.

Native of Pulkicador. The head brown; abdomen black, the last segment but one fulvous; legs black; and thighs fulvous.

From the Banksian cabinet.

**MARGINATA.** Oblong, black; margin round the thorax, wing-cases, scutell, and posterior part of the abdomen yellow. Linn.

Native of America; the antennæ fuscous, with the base yellow; the legs variegated.

**PECTINATA.** Black; outer base of the sides of the shield,

shield, and apex of the abdomen and wing-cases, white; antennæ pectinately. Fabr.

An American species. The antennæ nearly as long as the body.

**FLABELLICORNIS.** Black; shield before the margin, with marginal line at the base of the wing-cases and tip of the abdomen, white. Olivier.

Native of the Brazils; the antennæ very large, and fan-shaped; wing-cases slightly striated.

**HESPERA.** Ovale; wing-cases brown, with a triangular marginal yellow spot. Olivier.

Inhabits America.

**IGNITA.** Ovale; wing-cases brown, with an ovate marginal yellow spot. Linn.

Native of South America.

**LUCIDA.** Oblong; wing-cases brown, the outer margin pale yellow; abdomen yellow. Linn.

Inhabits South America, and resembles the common glow-worm.

**NITIDULA.** Oblong, fuscous; thorax yellowish, with a black spot in the middle; apex of the abdomen with two yellow spots.

An African species.

**PHOSPHOREA.** Oblong, sub-testaceous; abdomen black, behind fine yellow. Degeer, &c.

Native of America.

**JAPONICA.** Yellow; last segment but two of the abdomen black. Thunb. Nov. Sp.

This species inhabits Japan, and, according to Thunberg, flies about in the evening during the months of May and June, and emits a vivid phosphoric vapour from two vesicles at the end of the tail. The antennæ, eyes, wings, and last segments of the tail, except the two at the apex, black.

**ATRA.** Deep black; margin of the thorax rufous. Fabr. *Lampyris atra*, Olivier.

A North American species. The antennæ serrated.

**CAPENSIS.** Livid; thorax yellowish; posterior part of the abdomen fine yellow. Olivier.

Antennæ fuscous; scutell yellowish.

**AUSTRALIS.** Yellowish; head and wing-cases brown; tip of the abdomen clear white. Fabr.

Resembles the following species; the thorax and scutell ferruginous; ends of the legs black, the rest yellow. Inhabits New Holland.

**ITALICA.** Black; thorax transverse, and with the legs rufous; abdomen clear white at the tip. Linn.

Inhabits among trees in Italy; the antennæ are black; thorax without spots.

**VITTATA.** Rufous; wing-cases black, with a yellow margin, and abbreviated fillet in the middle. Olivier.

Found in Guadeloupe.

**MAURITANICA.** Wing-cases livid; body yellow. Linn. Native of Africa.

**HEMISPÆRA.** Black; wing-cases very short. Geoffr.

A small species found in France; the antennæ are compressed; shield rounded, entire, black, and without spots; wing-cases ovate, very short, and black; abdomen flat, and with the legs black.

**PUSILLA.** Deep black; tip of the antennæ, with the wing-cases, sanguineous. Marsh. Ent. Brit. *Lampyris nigro-rubra*. De Geer.

This appertains to the lycus genus of Fabricius, in which it occurs under the specific name minutus; it is also pyrochroa minuta of that author's Mantissa. The species is two lines and a half in length.

**LAMSPRINGE,** in *Geography*, a town of Westphalia, in the bishopric of Hildesheim, at the source of a small river

called Lame, which soon after runs into the Inner-see; 14 miles S. of Hildesheim.

**LAMUS,** in *Ancient Geography*, a small river of Greece, in Bœotia, which had its source on the summit of mount Helicon. Pausanias.—Also, a town and river of Asia, in Cilicia. Ptolemy places the mouth of the river between Sebaste and Pompeiopolis, and the town in a canton, which takes from it the name of Lamotie. This town was episcopal, and is placed by Leon-le-Sage and Hierocles in Iffauria, under the metropolis of Seleucia.

**LAMUZO,** in *Geography*, a town of Asiatic Turkey, in Aladulia, on a river of the same name; 24 miles W. of Tarsus.

**LAMY, BERNARD,** in *Biography*, who flourished in the seventeenth and eighteenth centuries, was of noble descent, and born at Mans in the year 1640; having been carefully initiated in the elementary parts of learning, he entered among the religious of the congregation of the oratory at Paris; from thence he went to Saumur to study philosophy. From 1661 to 1667, he was employed in giving instructions in the classics and the belles lettres, and in the latter of these years he was ordained priest. He now taught philosophy at Saumur and at Angers, till the year 1676, and while instructing others, he applied himself with the utmost intenseness to the study of every branch of literature and science, and made a very considerable proficiency. He was now directed by his superiors to go to Grenoble, where cardinal le Camus had established a seminary, for the education of ecclesiastics, in which Lamy was appointed professor of divinity. In every duty in which this excellent priest engaged, he was indefatigable; and as an author he published a great many valuable works; of these the most valuable, and which engaged his attention for thirty years, was entitled “*De Tabernaculo Fœderis de Sancta Civitate Jerusalem, et de Templo ejus, Lib. septem*,” illustrated with many plates. This work, which was replete with valuable information and very curious discussion, was not published till the year 1720, five years after the author's decease. The death of father Lamy was occasioned by the bursting of a blood-vessel, though he had been in a declining state some years previously to that accident. He was much esteemed for the modesty of his manners; for his unaffected piety and deep learning. Among the numerous works which he left as memorials of his industry, may be mentioned his “*Reflections on the Art of Poetry*;” “*A Treatise on the Equilibrium of Solids and Fluids*;” “*A Treatise on Magnitude in general, comprehending Arithmetic, Algebra, and Analysis*;” “*Dialogues on the Sciences and the best Manner of studying them*;” “*Elements of Geometry*;” and “*A Treatise on Perfection*.”

**LAMY, FRANCIS,** a French Benedictine monk, born at Montyreaux, in the diocese of Chartres, in the year 1636, was intended for the military profession, which, at the age of twenty-three, he exchanged for the ecclesiastical. He made a rapid progress in the several departments of literature, and his writings shew that he was deeply skilled in the knowledge of the human heart. He died in the year 1711, at the age of seventy-five. His biographers have highly praised him for the benevolence which he manifested on all occasions, and likewise for his candour, amiableness, and extraordinary piety. One of his most popular pieces was, “*A Treatise on Self-knowledge*,” in six volumes, which passed through several editions. Many of his other works were highly esteemed as good defences of natural and revealed religion; such were his treatise “*On the evident Truth of the Christian Religion*;” “*The New Atheism overthrown*,” in answer to Spinoza; “*The Unbeliever conducted to Religion by Reason*.” Lamy wrote on natural as well as theological subjects;

subjects; such is his work entitled "Physical Conjectures on the Effects of Thunder, and on other Subjects in Natural Philosophy." His style, though not wholly free from faults, is said to be more correct and polished than that of any writer in the French language of that class to which he belonged.

**LAN**, in *Geography*, a town of Persia, in Oberland; 14 miles N.N.E. of Joldau.—Also, a city of China, of the second rank, in the province of Pe-tcheli, on the river Lan; 113 miles E. of Peking. N. lat. 39° 48'. E. long. 118° 24'.—Also, a city of China, of the second rank, in Chen-fi, on the Hoang. It is situated near the great wall, and in the vicinity of the principal ports on the western coast, and it is therefore classed among the most important cities of the empire, and has been made the capital of the western part of the province, and the seat of government. The trade of this city consists only in skins, which are brought from Tartary, and different kinds of woollen stuffs. A coarse kind of stuff is made here of cow's hair, which is used by the inhabitants for making great coats to defend themselves from the snow. N. lat. 36° 6'. E. long. 103° 29'.—Also, a river of China, in Pe-tcheli, which runs into the gulf of Leaotong, N. lat. 39° 18'. E. long. 118° 36'.  
**LANÆ PETRA**. See **PETRA**.

**LANAGLA**, in *Geography*, a town of the island of Fortaventura, situated on the E. coast.

**LANARIA**, in *Botany*, so called from *lana*, wool, on account of the wooliness of the flower.—Ait. Hort. Kew. ed. 1. v. 1. 462. v. 3. 510. ed. 2. v. 2. 289. Schreb. 799. Willd. Sp. Pl. v. 2. 181. (Argolana; Juss. 60. Lamarek. Illustr. t. 34.)—Class and order, *Hexandria Monogynia*. Nat. Ord. *Enjateæ*, Linn. *Iridibus affine*, Juss.

Gen. Ch. Cal. none. Cor. superior, of one petal, somewhat bell-shaped, clothed externally with feathery wool; tube short; limb in six deep, linear-lanceolate, slightly spreading, equal segments, coloured within. Stam. Filaments six, thread-shaped, shorter than the corolla, inserted into the base of its segments; anthers ovate, somewhat incumbent. Pist. Germen inferior, turbinate, externally woolly; style thread-shaped, erect, the length of the stamens; stigma three-cleft. Peric. Capsule ovate, of three cells. Seeds two or three in each cell.

Eff. Ch. Corolla superior, externally woolly, longer than the filaments; its limb in six deep spreading segments. Capsule of three cells.

1. *L. plumosa*. Woolly Cape Hyacinth.—(Hyacinthus lanatus; Linn. Sp. Pl. 455.)—Native of the Cape of Good Hope, from whence it was sent to Kew in 1787; by the late Mr. Masson, and is kept there in the green-house, but has not yet flowered. Its habit is that of a *Diluvius*; see that article. Root fibrous, perennial. Stem erect, angular, hairy, most leafy in the lower part, terminating in a dense corymbose tuft of numerous flowers. The leaves are linear, keeled and channeled, smooth. The whole inflorescence is densely clothed with white feathery hairs.

**LANARIA** has formerly been applied as a name to several plants, either on account of their wooliness, as the larger kinds of *Verbascum*; or of their use in dyeing, or dressing, wool, or woollen cloths. Of the former description is the Dyer's-weed, *Reseda Luteola*; of the latter the Teasel, *Dipsacus fullonum*. Perhaps *Saponaria officinalis*, Soapwort, was called *lanaria radix* from its foaming quality.

**LANARIUS**, in *Ancient Geography*, a river of Sicily, placed by Antonine in his Itinerary on the route between Agrigentum and Lilybæa, between Ad aquas and Mazara.

**LANARIUS**, in *Ornithology*. See **FALCO**.

**LANARK**, in *Geography*, a royal borough, and the county-town of Lanarkshire, in Scotland, is situated about

30 miles to the W. of Edinburgh, near the left bank of the river Clyde. It is a place of great antiquity, having received its original charter as early as the reign of Alexander I. The government is vested in a provost, two bailiffs, a dean of guild, thirteen merchant-counsellors, and seven deacons of trades. The town consists of one principal street, which descends towards the Clyde, and five inferior ones branching off from it, besides lanes and closes. Many new buildings have been added within these few years. The streets are in general well paved with whinstone, and exhibit, especially near the centre of the town, a considerable degree of neatness. In early times Lanark appears to have been a place of some note. The eminence called Castle-hill, which lies between the town and the river, was the site of a castle, which, according to tradition, was built by king David I. and was for several centuries the residence of the Scottish monarchs. The charter of the town of Ayr, granted by William the Lion, is dated from this place, and many spots in the neighbourhood are distinguished by names of royal origin. The first assembly or parliament mentioned in the history of Scotland was convened in this town by Kenneth II. in the year 978. It is also rendered remarkable as the scene of the first great military exploit of the celebrated Sir William Wallace, that patriot having here commenced his glorious but unfortunate career by the defeat and death of William de Heselrig, or Heselrope, the English sheriff of Lanarkshire. It is said that this town was formerly fortified, but no traces of such works can now be discovered. The rising ground, named Castle-hill, however, bears some resemblance to an artificial mound, and may probably have been fortified in the time of the Romans, as a fine silver coin of Faustina was found on it several years ago. The old parish church lies in ruins about a quarter of a mile to the south-east of the town, and retains considerable marks of former elegance. The hospital of St. Leonard's, which stood to the eastward of the town, was founded by king Robert I. Upon digging up its ruins some time since, to prepare the ground for the plough, an urn, together with a variety of carved stones and other curiosities, were discovered under them. The same monarch was also the founder of a monastery of Franciscan, or Grey friars, situated to the west of the present church, where a general chapter of all the Grey friars in the kingdom was held on the 11th July, 1400. This town unites with Linlithgow, Selkirk, and Peebles in sending one member to parliament. The population of the town and parish, as ascertained in the parliamentary census of 1800, was 4692 persons, who occupied 643 houses. Sinclair's Statistical Account of Scotland.

**LANARK**, *New*, is described in the course of the following article.

**LANARKSHIRE**, an inland county in the south of Scotland, is frequently denominated *Clydedale*, from the river Clyde, which flows through it longitudinally in a winding course of more than sixty miles. The situation of this county is between 55° 22' and 55° 58' north latitude, and between 3° 15' and 4° 19' west longitude. It is bounded by Dumfriesshire on the south, by the shires of Ayr and Renfrew on the west, by the counties of Dumbarton and Stirling on the north, and by those of Linlithgow, Edinburgh, and Peebles on the east. Its length from north to south is about forty-seven miles, and its breadth nearly thirty-two. The parishes it contains are forty-eight in number, inhabited, according to the parliamentary returns in 1800, by a population of 150,600 persons. The surface contents are 927 square miles, or 593,280 statute acres. Lanarkshire anciently formed a great portion of one of the principalities into which Scotland was divided at the time of the Roman invasion. The name given to this kingdom was Strathclyde, which comprehended, besides the county of Lanark, those

## LANARKSHIRE.

of Stirling, Dumbarton, and Renfrew. This shire is divided into three districts, or wards, formerly known by the appellations of Clydesdale, Douglafdale, and Avondale, but these are now more frequently termed the upper, middle, and lower wards. Each of these districts is subject to the particular jurisdiction of a substitute appointed by the sheriff-depute of the county.

With respect to the *soil* and *appearance* of this county, the upper parts of it, except in the vicinity of the Clyde, are so hilly and moorish, as scarcely to be susceptible of any improvement from agriculture. The elevation of the hills is in general very great; some of them rise to the height of 600 feet above the level of the sea. Notwithstanding this, they exhibit but little grandeur, the perception of their size and altitude being much modified by the closeness with which they are crowded together. The chief part of the arable lands in the upper district, lies in the parishes adjoining to the hill of Tintoe, round which the Clyde flows with a slow and gentle current, washing, in its course to Lanark, twelve miles of the finest meadow-fields in Scotland. In the neighbourhood of Biggar, one of the towns in this district, the soil is uncommonly rich and fertile. This fertility is in many places principally owing to the inundations of the Clyde, which are likewise often the source of irreparable damage, by carrying off, not only the crops, but even the very soil it had formerly enriched. Proceeding down the river, the soil is found to be dry, light, and friable, but less productive than in the vicinity of Tintoe. Carlicke parish is of a clayey soil, but excellent in quality. This parish, and indeed all the parishes situated along the river, are particularly distinguished for the richness and variety of their scenery. Within this district are the falls of the Clyde, celebrated both by the poet and the painter. Above, as well as below these falls, the banks of the river are adorned with numerous country seats, and villages filled with industrious inhabitants.

The middle ward, or district of this county, is not nearly so elevated as that above mentioned. When viewed from any considerable height, indeed, it has the appearance of a level country, though in fact it is much diversified with hill and dale, the former being much less abundant than the latter. The soil of this ward is in general of a clayey texture, and within six miles of the river extremely fertile. The scenery here is no less beautiful than that of the upper ward, the banks of the Clyde being covered with hamlets, orchards, and plantations of various kinds: beyond the range of six miles, however, the country is of a very different description. It is supposed that there are not less than 40,000 acres of moor-land within this district, and such spots as are free from that covering, display a soft clayey soil, formed from a sort of hard clay, lamellated in a horizontal direction, which is called by the farmers *till*, and is known to mineralogists by the name of *schistus*.

The lower ward is extremely limited in extent, but may rank as the most important of the three, on account of its containing the city of Glasgow, which is justly denominated the Manchester of Scotland, and is perhaps scarcely inferior to Liverpool in point of commercial importance. The lands in this district are naturally barren and unproductive, but in the neighbourhood of Glasgow, the overflowings of a very prosperous commerce have added greatly both to its scenery and fertility. See GLASGOW.

The chief towns in Lanarkshire are Glasgow, Lanark, Rutherglen, Hamilton, Douglas, Biggar, and Carnwarth. Of these the three first are royal boroughs, and will be found described under their respective names. Many considerable villages are likewise scattered throughout the county. The most worthy of notice among these are those of Leadhills and

Wilson-town, which are indebted for their prosperity to the mineral productions of the county. *New Lanark*, which owes its origin to the cotton works established there by David Dale, esq. of Glasgow, is also a thriving and populous place. These works were first erected in the year 1785, and are perhaps the most extensive of their kind in Scotland. They afford employment to upwards of 1500 persons, many of whom are children. Great attention is paid to their morals and education. The situation of the mills is extremely singular and romantic, being nearly surrounded by high grounds of very steep ascent. They were built on this spot chiefly on account of the great command of water that could be obtained. For this purpose a subterraneous aqueduct has been cut through the solid rocks, for the space of several hundred yards. Both the works and the scenery around are objects of peculiar interest and curiosity. One of the mills contains no less than 6080 spindles.

Besides the Clyde, already so often mentioned, there is a number of other streams in this county, all of which, however, discharge themselves into that river. The chief of those on the northern side are, the Elwin, Glegonnan, the Little-Clyde, the waters of Duneaton and Coutten, and the two Calderns. None of them are remarkable, except that the two latter are well shaded with wood, and adorned with a number of neat villas. The streams on the southern side of the river are rather more deserving of attention. The Mous-water is particularly remarkable for that part of its banks called Cartlane-Craigs. These form a curious and romantic den, or dell, somewhat more than a quarter of a mile in length. The rocks on either side rise to the height of four hundred feet, exhibiting a terrific and rugged appearance in one spot, while, in another, the eye is relieved by a pendent covering of coppice wood. At the bottom runs the river Mous, so closely confined as scarcely to allow room for the lonely traveller to traverse the den. At all the windings of this river the scenery varies, and whenever a rock is found to project on one bank, a corresponding recess may be seen on the other. One of these caverns is still called "Wallace's Cave," from a tradition of its having been for some time the place of that hero's concealment. Logan-water, which rises in the mountain separating the parish of Lesmahago, from that of Muirkirk in Ayrshire, is a beautiful pastoral river. The Avon, which likewise takes its rise on the confines of Ayrshire, after being joined by several minor streams, empties itself into the Clyde near the town of Hamilton. In its course it passes through the inclosures of the duke of Hamilton, where its bold and lofty banks, covered with a variety of shrubs and trees, afford many extremely fine and picturesque views.

No county in Great Britain is more interesting to the geologist, or abounds with a greater variety of *mineral productions*, than Lanarkshire. The surface of the upper division of the county generally rests upon whinstone, standing in perpendicular columns. The middle and lower districts, for the most part, exhibit some kind of freestone for their base, but are intersected, at different points, by ridges of whinstone running off from the rocky mountains, downwards, throughout the whole extent of the county. Under the strata of freestone immense strata, or beds of *coal*, are discovered, extending over all the plain country, and branching out, more or less, along the course of the principal waters. The seams of this useful mineral are not entirely of one kind. Where the whole strata remain untouched, a variety of thin and less valuable seams, or strata, present themselves in digging down to what is commonly called the *upper coal*, because it is the first that is found to be worth mining for to any extent. This stratum is composed of the *rough coal*,  
except.

except a small portion in the middle of it, which is of the kind called splint. After this, comes the *ell coal*, which is much esteemed for the blacksmith's forge. At from ten to seventeen feet beneath this stratum, the seam called the *main coal* is found. It is so named because it possesses all the good qualities of the other strata, and is preferred, by consumers in general, to every other species of this mineral. Below the main coal are four more seams. The highest of these is composed of the *bump coal*, the second of the *barid coal*, the third of the *soft coal*, and the fourth and last seam of the *lean or four-milk coal*. Beneath all are found several strata of excellent limestone, probably as extensive and inexhaustible as the valuable mineral which covers it. Independently of these strata of coal in the plain, there are others in the higher grounds, but of a dissimilar nature and arrangement. The hills in the parish of Shotts, like the tracts of the same elevation in the upper ward, are found to consist of an enormous bed of whinstone, but in descending along their sides, the freestone rock shows itself lying in a horizontal position beneath the whinstone. Below the free-coal, ironstone and limestone are discovered in such vast profusion, as seemingly to defy the utmost efforts of human industry to exhaust them. Near the Douglas river also, extensive collieries, similar in quality to those of Shotts, are wrought, which supply the higher districts of this county and Tweeddale, where no coal has yet been discovered. To the vast supplies of this valuable mineral, and its consequent cheapness, the manufacturing prosperity of the west of Scotland is to be principally attributed, as, without abundance of fuel, scarcely any manufacture can be carried on.

**Lead and Iron.**—Another great source of industry and opulence bestowed on this county by nature, is derived from its mines of lead and iron. The former of these metals is chiefly wrought at Lead-hills, a range of mountains in the uppermost part of the county, immediately adjoining to Nithsdale. These mines belong to the earl of Hopetoun, and are carried on by two separate companies. The number of miners employed in them is very great. They work only six hours out of the twenty-four, so that they have much leisure time, a great portion of which is dedicated to reading. To facilitate this worthy employment of their time, a library was established many years ago by an overseer named M<sup>r</sup> Sterling, who prevailed on the workmen to subscribe for that purpose. Since that event the miners have been remarkable for industry and sobriety of manners, the usual concomitants of a taste for literature; and the example has been followed with similar effects at the neighbouring mines of Wanlockhead.

The iron of this county is found every where in the same tract with the strata of coal. In many places it is imbedded between the different seams of that mineral, and is usually wrought at the same time with it. Iron ore, that is, the metal in its richest state, has not yet been discovered here in any great quantity, but ironstone exists in great profusion. It is found either in the form of beds of rock, or in collections of nodules or ironstone balls, as they are called by the workmen, of various shapes, sizes, and qualities. Among these balls is the curious fossil called *ludus Helmontii*, *septuarium*, or *swazen veins*. It is of a spherical shape, more or less oblate or depressed. Above and below them are alternate strata of ironstone and schistus. They lie on their depressed sides, in a regular direction, making a sort of interrupted stratum, one stone being several inches and some even a foot or two distant from the other. The ironstone of which they are composed is of excellent quality, yielding sometimes fifty per cent. of iron.

The *Antiquities* in this county are not so numerous, in pro-

portion to its extent, as in some other counties of Scotland. The Roman road, which formerly crossed the parishes of Lamington and Biggar, and descended along the south bank of the Clyde, is now only visible in a few detached spots. Different parts of the upper wards, in particular, abound with excavations in the earth, or vaults which were used as strong holds by the aboriginal inhabitants, when the haughty chieftains of Clydesdale and Annandale were engaged in mutual hostilities and depredations. At Cold-chapel are the remains of a Roman station, and in the same neighbourhood is a spot called Wallace's Camp. It is said that a chair, which formerly belonged to that hero, is still preserved at Biggerton.

Near Biggar are several artificial mounds. The church of that town is one of the most venerable relics of monastic architecture in Scotland. Here is preserved an ancient vase or urn, supposed to be Roman, which was usually appropriated to sacred purposes by the Popish priests. Boghall castle, about a mile from this church, was formerly surrounded by a marsh, and accessible only by a causeway or mound of earth. The entrance is through a large and magnificent gate-way, which leads into a spacious court in the centre. This castle is flanked with towers. It was formerly the residence of the Flemings, earls of Wigton, and has evidently been one of the most extensive and splendid fortresses in Scotland. This neighbourhood is represented in the popular histories of sir William Wallace, as having been the scene of a sanguinary conflict between his band of patriots and the army of Edward I.

Cuthally castle, or, as it is vulgarly called, Cowdally castle, the seat of the ancient family of Somerville, is situated in the parish of Carnwarth, and appears to have been formerly a place of great strength. At the foot of Tintoe is an artificial mount, and near it a circle of large stones set up perpendicularly. On an adjacent farm is a place called Sheriffs' flats, where it is supposed the sheriffs anciently held their courts. Tradition reports, that a bullock's hide, full of gold, is buried under this spot. Here are also the walls of a castle which belonged to the family of Lindsay. In Pittinair parish are the vestiges of a large encampment, the figure of which approaches to a circular area. A small fort belonging to it is still distinctly visible at a little distance from the walls. Several urns have been lately found here inclosed within four large flag stones. At Douglas are the remains of a castle belonging to the powerful family of that name. The greater part of this building was unfortunately consumed by fire about fifty years ago. In the old church of St. Bride's, in Douglas, are a number of monuments in honour of the Douglases. The parish of Carlairs, in the vicinity of the Clyde, contains the vestiges of a Roman camp, the causeway leading to which can still be traced for many miles. Pots and dishes of different kinds, as well as various instruments of war and sacrifice, have been discovered here. A number of coins have also been dug up, bearing the inscription of Marcus Aurelius, and Marcus Antoninus. At Cleghorn is another Roman camp, supposed by general Roy to have been the work of Agricola. Besides these remains of antiquity there are a number of others; as the priory of Lesmahago, the castles of Cudzow and Avondale, &c. but the limits of this article will not allow us to particularise the whole. Many of them, however, will be found either described or noticed in our accounts of the respective places. Rothwell castle, in this district, is one of the most magnificent ruins in Scotland. The structure itself is superb, and all the objects around have an aspect of grandeur. The whole work is executed with smooth stone of a red colour. It is adorned with lofty towers at both ends,

ends, and has undoubtedly been a place of considerable strength.

The principal seat in Lanarkshire is the palace of Hamilton, belonging to, and the occasional residence of, the Hamilton family. It is a large massive pile, of a dull and heavy appearance, situated in the neighbourhood of the town, from which it derived its name, and deserves notice chiefly on account of the beauty of its scenery, and the valuable collection of paintings it contains.

Lanarkshire has long been celebrated for its horses, which are reckoned among the most powerful in the world. As containing the town of Glasgow, it must be ranked among the first manufacturing and trading counties in Great Britain. Forsyth's Beauties of Scotland, vol. iii.

LANAWEN, in *Geography*, one of the smaller Sooloo islands, in the East Indian sea. N. lat. 6° 15'. E. long. 122° 3'.

LANCARIM SPRING, the name of a medicated water of Glamorganshire. It has its name from a village near which it rises, and has been very long famous in the place for the cure of the king's evil. The body of water is about an ell broad, and runs between two hills covered with wood. About twelve yards from this spring the rill falls from a rock of about eight or nine feet high, with a considerable noise. The spring is very clear and rises out of a pure white marle. The cures that have been performed there are proofs of a real power in the water; but there is some question, whether the water, or its motion and coldness, does the good; for the people, who come for relief, always drink of the spring, and bathe the part afterwards in the fall below. It is generally supposed that the lime-stone rocks communicate a virtue to it, by which it cures internally; but it has been often found, that the holding a limb disordered with the evil, in the strong current of a mill tail, has cured it; and there is the same advantage in the fall of this water. Phil. Trans. N° 233, or Abr. vol. ii. P. 233.

LANCASHIRE, in *Geography*, a county palatine in the northern part of England, surrounded by Cumberland and Westmoreland to the north, by Yorkshire to the east, Cheshire to the south, and the Irish sea to the west. Its area comprises about 1,130,000 acres of land, of which above 350,000 are in a state of tillage, 450,000 in pasture, and about 400,000 in wood-lands, moors, &c. According to Mr. Yates, who has published an Agricultural Survey of Lancashire, the greatest length, from north to south, is 74 miles, by about 44 in breadth: the circumference is 342 miles, and surface 1765 square miles. It is divided into the six hundreds of Amounderness, Blackburn, Leyland, Lonsdale, Salford, and West-Deby; and contains six boroughs, *viz.* Clitheroe, Lancaster, Liverpool, Newton, Preston, and Wigan; 21 market towns, *viz.* Blackburn, Bolton, Burnley, Bury, Cartmel, Chorley, Colne, Dalton, Eccleston, Garlang, Hallingdon, Hawthhead, Hornby, Kirkham, Manchester, Ormskirk, Poulton, Preaton, Rochdale, Ulverston, Warrington; and 62 other parishes. The whole contains, according to the return to parliament in the year 1800, 117,664 houses, and 672,731 inhabitants, of whom 269,259 were slated to be employed in various trades and manufactures, and 52,018 in agriculture.

In the ancient history of this county, we find that it was originally inhabited by the Setantii, or Segantii, who were succeeded by the Brigantes, who also had a very extended tract of country. (See BRIGANTES.) The Romans, under Julius Agricola, appear to have conquered this district in A. D. 79: and soon afterwards, according to Mr. Whitaker, that general established the following stations within the

limits of this county: "Ad-Alaunum and Bremetonacæ in the north; Portus-Siluntiorum in the west; Rerogorium and Coccium about the centre; Colonea in the east; and Veratinum and Mancunium in the south." The precise sites of all these stations are not satisfactorily ascertained: nor is it generally admitted, by other antiquaries, that there were so many permanent stations in the county. In the Itinerary of Antoninus only three are specified: *viz.* Bremetonacæ, xxvii. m. p. from Galacum in Westmoreland; Coccium, xx. m. p. from the former; and Mancunium, xvii. m. p. from the latter. To connect these towns or stations, roads or military ways were formed, and these were disposed in the most direct line from one place to another, and constructed in the most scientific and skilful manner. Mancunium, now Manchester, was a station of large extent and importance; and from it roads branched off northward to Coccium, (Ribechester,) two north-eastward into Yorkshire, one south-westward to Condate, now Middlewich in Cheshire, and a fifth south-eastward to Derwentio, Derby. The whole of this county was denominated by the Romans, Maxima-Cæsariensis, or Britannia-Superior. The Saxons included it in Northumbria; and, according to Mr. Whitaker, "formed it into a separate county about 680, and soon after the conquest of it by Egfrid." At this period, the Roman Alauna was "made the metropolis of the shire, and lent its own appellation to the county." Soon afterwards the whole was divided into hundreds, tythings, &c. That part called South Lancashire was first divided into three; and subdivided into six just before the Norman conquest: these are called Blackburn, Derby, and Salford; Newton, Warrington, and Leyland.

The ecclesiastical history of this county commences with the Anglo-Saxons; after the see of York was established, the kingdom of Northumbria was speedily subdivided into several dioceses, and the whole of North Lancashire was connected with the see of York. But soon after the consolidation of the seven kingdoms into one, the south of Lancashire was severed from the diocese and province of York, and annexed to the province of Canterbury and diocese of Lichfield; and thus continued till the year 1541, when the two parts were again combined, as they have ever since continued, under one bishop, and reunited to their ancient and original see of York. At the first partition of the bishopric into archdeaconries, the principal towns of the latter would naturally be constituted the capitals of them: and the Roman colony of Chester was made the metropolis over the south of Lancashire, as the archdeaconry of Richmond was over the north. The next ecclesiastical division of the county was into rural deaneries, and by the "Valor Beneficiorum," which was taken in 1292 by command of pope Nicholas IV., the whole county of Lancaster, exclusive of Furness, which then belonged to Westmoreland, was partitioned into thirty-six parishes only. By the same record it appears, that these parishes were included in the four deaneries of Blackburn, Leyland, Manchester, and Warrington; all in the archdeaconry of Chester. The deanery of Amounderness and Furness is in the Richmond archdeaconry.

The landed property, which the king possesses in this county, as duke of Lancaster, is of great extent; but the revenues arising therefrom are but small. The principal part of this property consists in what are generally styled the forests of Myerfough, Fulwood, Blearfield, Wyerfdale, and Quern, all situated in the most northern parts of the county. In these his majesty is intitled to the estrays and the game, and the right of holding courts, &c.; and must be considered as lord of the manor of all the forests. The township of Quernmore is situated in the hundred of Lonsdale;

dale, and contains above 3000 acres of inclosed and walle land. Wyerdale, which is similar in situation, contains more than 20,000 statute acres; the greater part is mountainous land, not worth inclosing, but producing abundance of game. Blearfdale is in the hundred of Amounderness, and contains nearly 4000 acres of inclosed land, and about the same quantity not inclosed. Myerfough is situated about eight miles from Preston; and consists of nearly 2200 acres, all inclosed; of which about 1600, belonging to the king, is called Myerfough Park, and is held under a lease by Mr. Heatly. The ancient forest of Fulwood comprised a large quantity of land which is now inclosed: the uninclosed parts are about 908 acres. Preston race-ground is a portion of the forest. Besides the duchy lands, a few large proprietors hold extensive estates in this county. But the prevalence of trade, manufacture, and commerce has tended greatly to subdivide the property, in the vicinity of the large towns especially, and hence Lancashire has a greater number of landowners than any other county in England, excepting Middlesex. Camden remarked, that Lancashire was distinguished for the number of ancient families whose names were the same as their manorial estates. This remark still applies, though not to the same extent, as many old family manions are now deserted. Previous to, and under the Norman dynasty, this county was distinguished as an *honor*, and was of the superior class of feignories, on which inferior lordships and manors depended, by the performance of certain customs and services to the lords who held them. Landed honors originally belonged to kings exclusively, but were afterwards granted in fee to noblemen. These kept their honor courts "every year at least, or oftener if need be; at which court all the freeholders of all the manors that stand united to the said honor, shall make their appearance, which suitors shall not fit, but stand bareheaded." That the honor of Lancaster existed before the conquest, is demonstrated by an agreement, still preserved, between king Stephen and Henry duke of Normandy. From this period till the reign of Henry III. the honor was held by several great persons. That monarch conferred it on his second son Edmond, when it became an earldom. The title of *duke of Lancaster* was created by Edward III. in favour of Henry Plantagenet, whose daughter and heiress, Blanche, married John of Gaunt, fourth son of Edward III., for whom the privileges and revenues were considerably increased: he, being created duke of Lancaster on the death of his father-in-law, obtained a patent for advancing this county to the dignity of the palatinate. The court belonging to this duchy has the power of deciding every cause relating to it: the officers are, a chancellor, attorney-general, king's serjeant, king's counsel, receiver-general, clerk of the council and register, surveyor of lands, attorney in the exchequer, attorney in chancery, four counsellors, &c. The offices of the duchy court are at Somerset place, London.

The soil and surface of Lancashire are various; and its features in some parts, particularly towards the north and along the eastern border, are strongly marked. Here the hills are bold and lofty, and the valleys narrow and irriguous. On the sea-coast, and nearly the whole of the southern side of the county, following the course of the river Mersey, the land is low and flat. In the district which lies between the Ribble and the Mersey, the greater part of the surface is a sandy loam, well adapted to the production of almost every kind of vegetable, and that to a degree which renders it impossible to estimate the advantages which might be derived from an improved cultivation. The substratum is generally the red rock, or clay marl, one of the most desirable soils that can be found. Moor-lands which are in a state of na-

ture, and produce heath and other wild plants, are of various qualities; and are much more extensive than might have been expected in a county so populous, where land must consequently be very valuable.

The mineralogical history of this county has never been publicly developed; and though the internal contents are singularly rich, the varied peculiarities and characteristics of these riches have not been made known. With singular advantages of natural and artificial navigation, the *coals*, which constitute its most prolific and useful production, are cheaply conveyed to the various manufactories of Manchester, Bolton, &c. and also to the coal. Coal is found in immense beds, both on the southern part and towards the middle of the county, but chiefly in the hundreds of West Derby and Salford, and in part of Blackburn. It is not obtained much farther north than Chorley and Colne; but great abundance of this useful fossil is again procured at Whitehaven, and about Newcastle-upon-Tyne. At Haigh, near Wigan, a species of coal is produced, similar in appearance to black marble, and of a very bituminous quality. It is called *Cannel Coal*, and burns with a peculiar clearness of flame, consumes very rapidly, and is apt to fly in pieces in the fire; but if previously immersed in water, it is said to lose this property. It is of a dull black colour, breaks easily in all directions; and if broken transversely, presents a smooth conchoidal surface. Towards the north and north-eastern parts of the county, lime-stone is very abundant. It is found at Halewood, near Liverpool, at various depths, but inconsiderable in quantity. In the vicinity of Leigh, and also at Ardwick, near Manchester, is lime-stone of such peculiar quality, as to resist the power of water: it is therefore applied to the construction of cisterns, and to making mortar for building under water. *Stone* of various denominations is produced in this county. Upon the common, near Lancaster, is a large quarry of excellent free-stone, which bears a fine polish, and of which that town, equalled by few in the kingdom for neatness, is wholly built. Flags and grey slates are found at Holland, near Wigan. The mountains, called Conistone and Telberthwaite fells, near Hawkhead, afford a large quantity of blue slates, of which there is a considerable export: they are divided into three classes, called London, Country, and Tom slate, of which the first is esteemed the best. Scythe-stones are obtained at Rainford, and are well wrought on the spot. Iron-ore is found in abundance between Ulverstone and Dalton, in Low Furness. In the north, some copper mines have been worked; but they have not been productive. At Anglefack, near Chorley, is a lead mine belonging to sir Frank Standish, bart.: it consists of several veins, which intersect the strata of the district almost perpendicularly, and run in various directions. The matrix of these veins is formed of carbonat and sulphuret of barytes. The former, which is a very rare mineral, is found in the greatest abundance near the surface; and as it descends, it becomes progressively contaminated by the sulphuret, which, in the lowest strata, seems completely to usurp its place. The existence of carbonat of barytes, as a product of nature, was first distinctly ascertained by Dr. Withering; but he seems to have been mistaken as to the place where his specimens were obtained. To James Watt, jun. esq. the public are indebted for a description of the external character of this substance, and its effects on the animal body, when taken internally. See Manchester Memoirs, vol. iii.

The principal rivers in this county are the *Loyne* or *Lune*, the *Wyer*, the *Ribble*, the *Calder*, the *Douglas*, the *Irwell*, and the *Mersey*. Besides these there are several smaller streams or rivers, all which, directing their courses

towards

## LANCASHIRE.

towards the west, empty their waters into the Irish sea. The Loyne or Lune, emanating from the fells of Westmoreland, enters this county near Kirkby Lonsdale. Soon afterwards its stream is augmented by the waters of the Greta and the Wenning from Yorkshire; and the expanded river then passes through the much admired valley of Lonsdale. Pursuing a south-westerly course, it reaches the county town, where it becomes navigable; and at the distance of two miles from Lancaster, is calculated to bear ships of considerable burthen. The approach to Lancaster is indescribably striking, where the river becoming wider, and winding in several bolder sweeps, opens to the view of that singular town, descending from a lofty hill, whose summit is crowned by the battlements of its castle, and the lofty tower of its church. The Wyer, which has its source among the moors on the north-eastern part of the county, meanders through a very romantic district; and pursuing a south-westerly course towards the sea, receives the waters of several other mountain-streams before it reaches Garstang-church town. Near this place its current is greatly increased by the waters of the rivers Calder, &c.; and passing near the town of Poulton, expands into a broad basin, called Wyer-water; and, again contracting its banks, joins the Irish sea between Bernard's-Wharf and the North Scar. The Ribble, like the Loyne, unites to the sea by a very broad estuary; and, like that also, has a Roman station on its banks. "This river," Dr. Whitaker observes, "by the general consent of most antiquaries, has been understood to be the *Belisima* of Ptolemy." The Ribble is one of the largest rivers in the north of England, and has its source in the high moors of Craven in Yorkshire. Taking first a southerly course, it passes by the town of Clitheroe, and, forming the boundary of the county for a short space, is joined by the Hodder and the Winburne from Whalley. The chief course of this river is through a highly commercial and well cultivated country; and near the thriving town of Preston, its banks are bold, and adorned with hanging woods. A little to the west of this place, the Ribble forms a spacious estuary, which is enlarged by the mouth of the river Douglas. The latter has its source in the vicinity of Rivington-pike, and, after passing the town of Wigan, proceeds north-westerly by Newburgh, and near Rutford is joined by the Elder-brook from Ormskirk. After receiving the united streams of the Yarrow and Lostock rivulets, it empties itself into the estuary of the Ribble, at a place called Muck-Stool. The Irwell originates in the moors, near the Yorkshire and Lancashire boundaries, whence it flows, swelled by other streams, through the manor of Tottington to Bury. Hence it proceeds to Manchester, where it unites with the Medlock and the Irk. Passing through Barton, where the duke of Bridgewater's canal is carried over it by means of a grand aqueduct, it falls into the Mersey below Flixton. The Alt, rising near Knowley, and flowing in a north-westerly direction, joins the Irish sea near Formby Point. The Crake connects the lake called Thurston-water with the sea at Leven Sands. The waters of Winandemere lake join the sea through the channel of the Leven nearly at the same place.

Although canals in a commercial and manufacturing country are of almost incalculable utility and importance, yet their origin in this kingdom is but recent; and from the best authority it appears that the first complete artificial canal was planned and formed in Lancashire. This was known by the name of the Sankey; but long previous to the making of this canal, different acts of parliament had been obtained, and companies formed, for rendering the rivers Irwell and Mersey, also the Weaver, &c. navigable. By the assist-

ance of the tide, which flows with rapidity up the channel of the Mersey, vessels were enabled, without any artificial help, to navigate nearly to the town of Warrington. To render the higher parts of the river, through its communicating branch the Irwell, accessible for vessels as far as Manchester, was an improvement much wanted by the manufacturers of that town and its vicinity. To effect this, an act of parliament was obtained in 1720, whereby certain persons of Manchester and Liverpool, but mostly those of the former town, were empowered to make the Irwell and Mersey navigable beyond those towns. Though the act specified this extent of river, yet as the Mersey was already navigable from Liverpool to Bank-key, near Warrington; and as all the stipulated demand for tonnage was confined to the navigation between that place and Manchester, it appears that the projectors meant only to open the upper part of the river. This has been effected by means of weirs, locks, &c.; and in places where the stream formed considerable curvatures, cuts were made across the necks of the principal bends. While the navigation of the Mersey was thus an object of commercial speculation, that of the Douglas was equally attended to. The country round Wigan being particularly rich in coal, the proprietors of the mines in that district obtained an act, in 1719, for rendering that river navigable. This being completed in 1727, enabled the speculators to convey their coals to the mouth of the Ribble, and thence coastwise to the northern parts of Lancashire, Westmoreland, &c. The Douglas navigation has since been purchased by the proprietors of the Leeds and Liverpool canal, who have in part substituted an artificial cut for the natural channel of the river. The Sankey canal originated with a company of gentlemen and merchants, who, in 1755, obtained an act of parliament, authorising them to make Sankey brook navigable from the Mersey river, which it joins about two miles west of Warrington, to near St. Helen's. This act empowered certain commissioners to purchase lands and other requisites for the intended navigation. It was, at first, designed to extend and deepen the bed of the brook; but, after due deliberation, it was ultimately determined to cut a detached channel or canal. To effect this more completely, a new act was obtained in 1761, which empowered the undertaker to make a canal; to extend from a place called Fiddler's Ferry, on the Mersey, to a spot about 250 yards from the lowest lock. Thus navigable canals had their rise in England; and the peculiar advantages and success of this at Sankey led to many other similar undertakings; in the execution of which, the genius of the engineer, and the speculating spirit of the nation, were fully brought into action. But many things which were then imagined to be unattainable, and insurmountably impracticable, have been recently effected. The chief article conveyed by the Sankey canal is coal, of which, in the year 1771, according to an account laid before parliament, were carried to Liverpool 45,568 tons, and to Warrington, Northwich, and other places, 44,152 tons. Some of the first collieries on its banks are worked out, and others have been opened. Its business has been increased by the large copper-works belonging to the Anglesea company, erected on one of its branches; and by the plate-glass manufactory, and other works founded near it, in the neighbourhood of the populous town of St. Helen's. Besides the Sankey, this county is intersected by nine other canals, of which four communicate with Manchester. Of all these canals an account has been given under CANAL, to which we shall here add some further particulars and local circumstances not already detailed. The Ashton-under-Line canal, which communicates between Manchester and the town of

## LANCASHIRE.

Ashton, was made in consequence of an act of parliament passed in 1792. The whole length of this canal is eleven miles, with a rise of 152 feet. Bridgewater's canal originated, in 1759, with the late patriotic duke of Bridgewater, who devoted an immense fortune to the effecting his plan. That part of the canal more immediately connected with this county, commences at the Cattle-field, in the suburbs of Manchester, and terminates at Pennington, near the town of Leigh. At Worsley is a short cut to the entrance basin of the underground tunnels. Here it buries itself in a hill, which it enters by an arched passage, partly bricked, and partly formed by the solid rock, wide enough for the admission of long flat-bottomed boats, which are towed by means of rings and hand-rails on each side. The canal, or tunnel, penetrates above three quarters of a mile before it reaches the first coal-works; where it divides into two channels, branching to the right and left. In the passages, at certain distances, are funnels cut through the rock, and issuing perpendicularly at the top of the hill. The arch, at the entrance, is only about six feet wide, and five in height, above the surface of the water. In some places within it widens, to accommodate two boats to pass each other. To this subterraneous canal the coals are brought from the mines in low waggons which hold about a ton each, and these are easily pulled down a gentle declivity, on an iron railway by one man. Lancaster canal takes its course through nearly the whole county. Commencing at Kirby Kendal, in Westmoreland, it enters Lancashire near Burton, having passed under ground about half a mile near Medway. At Borwick, a little south of Burton, it sinks to its mid-level, which it preserves for several miles, making for this purpose a very winding course, in some places approaching almost close to the sea-beach. After passing Preston, it ascends through a series of locks to its highest level, on which it proceeds across the Douglas, and arrives at its termination at West Houghton. The principal object of this canal is to open a ready communication between the coal and limestone countries, thereby interchanging and conveying these articles to different places, and to open the port of Lancaster to other populous towns. All the county north of Preston is destitute of coal, and the canal is directed through a district abounding with this valuable mineral from West Houghton to Whittle Hills. From Kendal to Lancaster, the whole country consists of lime-stone; and on Lancaster Moor some good freestone is obtained. The Leeds and Liverpool canal enters Lancashire a little north of the town of Colne, near which it crosses the grand ridge by means of a subterraneous tunnel at Foulridge, 1630 yards in length. Near Bark Mill, not far from Wigan, it crosses the Lancaster cut by means of an aqueduct bridge sixty feet above that canal. A navigation between the eastern and western seas had been often proposed: this great desideratum has been at length effected; and a canal has now been made between the towns of Liverpool and Leeds, including a line of 107½ miles, and communicating at the latter place with the river Aire, and at the former with the river Mersey, both of which are navigable to the German ocean on the east, and to the Irish sea on the west. The fall of water in this course, from the high ridge of mountains which divide Lancashire and Yorkshire, is 527 feet westward, and 446 eastward. Manchester, Bolton, and Bury canal takes a north-westerly direction from the former to the latter town. Its northern end is considerably elevated, and its whole course comprehends a line of fifteen miles one furlong. The Rochdale canal opens a navigation from the Bridgewater canal at Manchester, to the Calder at Sowerby-bridge, near Halifax. At the commencement of this scheme it encountered much

opposition; and the proprietors, in obtaining their acts, were obliged to bind themselves not to use any of the waters of the Irk, Calder, and Rouch rivers, so as to affect their mills, &c. They were, therefore, obliged to make several large reservoirs on the hills to supply the waste of lockage and leakage. At Ulverstone is a short cut or canal of about one mile and a half, communicating from that town to the Irish sea. Douglas River Navigation commences in the tide-way, in the estuary of the river Ribbles, near Hesketh, and terminates in the Leeds and Liverpool canal. Haslingdon canal, not yet completed, is intended to communicate, in a distance of about thirteen miles, between Bury, where it joins the Bolton and Bury canal, to Church, where it joins the Leeds and Liverpool. The commercial and speculating spirit of the inhabitants of this populous county, is strongly exhibited in the construction of these canals and navigable rivers; the good effects of which are especially felt by the manufacturing towns. To that of Manchester, in particular, the canals have proved eminently beneficial, and the thriving ports of Liverpool and Lancaster, with the central towns of the county, have all derived from the same source many important advantages. Whilst the natural produce of the county is readily and cheaply conveyed to various markets, and the coals sent to the devouring factories; the manufactured goods of the latter are thereby distributed over the kingdom, and to the sea-ports for foreign exportation.

Peculiarly characteristic of this county are the bogs and morasses with which it abounds, and which bear the provincial name of Mosses. The principal of these are called, from the chief places in their vicinity, Chat, Pilling, Trafford, Risley, Ashton, Road, Bickerstaff, Rainford, Marton, St. Michael's, and Catforth. The component parts of these chiefly consist of a spongy soil, containing roots of decayed vegetables, intermixed with a sort of rotten mould. The origin and peculiarity of mosses have occasioned much difference of opinion with the writers on agriculture and natural history, but when their precise situations are accurately defined, it seems easy to account for the latter, and thereby to discover some clue for the former. The laws of nature are immutable; and when certain natural causes are known to produce certain effects, and these are invariable, it does not appear difficult to ascertain the primary source. Thus, mosses or bogs are always found near spring-heads, and in such hollows as prevent a regular and constant discharge of the oozing waters. These must consequently remain stagnant, and from the perpetual generation and decomposition of vegetable matter, must progressively acquire substance. Among the most common vegetables in these situations, are the *Erica vulgaris*, the *Ornithogalum luteum*, and the different species of *Eriophorum*, or cotton-grass; also, bilberry, cranberry, crowberry, *Andromeda polifolia*; Lancashire aphodol, sun-dew, and the fragrant *myrica-gale*, or bog-myrtle. As these plants decay, and deposit their substances, a considerable addition is annually made to the moss, in cutting a section of which, in some places, the progressive stratification or lamina may be distinctly discovered. These plants, and particularly the mosses, seem to derive their nutriment and fructification from their own ruins, and grow more luxuriant as the substance increases: at length the whole takes the appearance and consistency of a large fungus; and continuing to increase, it at length grows greatly above the level of the adjacent lands, till the weight of the surface becoming too great to be supported by the spongy substance below, it overflows its original boundary, and covers the adjoining grounds. A remarkable instance of this occurrence, in the year 1771, is related of Solway-moss in Scotland; and, according to some

of our ancient chronicles, a great portion of Chat-mofs was carried into the Irwell, thence into the Merley, and on to the fea. (See Leland's Itin. vol. vii. p. 46.) It may be proper juft to mention three of the mofes in this county which have been brought into a ftate of improvement. Trafford-mofs, on the fourth fide of the river Irwell, containing about five hundred acres, has been brought into cultivation by Mr. Wakefield and Mr. Rofcoe of Liverpool. They began their improvements about the year 1793; and the whole of this hitherto ufelefs tract of land is converted into excellent arable and palture ground, worth four or five pounds per acre, *per annum*; but previous to that period it was wholly unproductive. The manures ufed in the improvement have been blue marle, of a ftiong calcareous quality, which is found under the mofs itfelf, and compoft brought by the canal from Manchester. Chat-mofs, which lies on the north fide of the river, and contains fome thoufands of acres, has been brought into a ftate of progrefive improvement, with every profpect of fimilar fuceefs, by Mr. Rofcoe, who commenced the drainage in the year 1805. Rainford-mofs, near Prefcot, has alfo been amazingly ameliorated under the judicious management of Mr. Chorley, who began his operations on this apparently ftérile wafte in 1780, and has rendered it capable of bearing oats, barley, clover, potatoes, &c.

The agricultural productions of Lancashire are principally oats and potatoes; both which are ufed for human fultenance; and many of the labouring claffes, in the northern and eaftern parts of the county, are chiefly fupported by this food. A confiderable quantity of barley, and fome wheat, are cultivated in Low-Furnefs, the Filde, and in the fouth-weftern parts of the county; but it is fuppofed that Lancashire does not produce one quarter of the grain confumed by its own inhabitants. The firft potatoes laid to be cultivated in England were grown in this county. They were originally introduced into Ireland from North America, about the year 1565; and in confequence of an Irish veffel being caft away on the weftern coaft, near North Moofs, in Lancashire, fome of thofe roots were planted in that part of the county; but it was not till many years after that they were adopted as an article of food in London. They are now grown in amazing quantities in this county; and many are annually exported hence to Ireland. They are produced both from cuttings, and from the apple, or feed. The ox-noble and clufter potatoe are chiefly grown for the cattle; and the pink-eye, with various kinds of the kidney, are ufed for the table. The produce of a crop of potatoes in this county is generally from two to three hundred bufhels per acre. Many ufeul particulars relating to the beft mode of planting, growing, and preferring potatoes, are detailed in Holt's "General View of the Agriculture of Lancashire."

This county boatts a peculiar breed of horned cattle, which forms a variety with thofe of Lincolnshire. The cows are rather fmaller than thofe of the latter county, and are known by their wide-spreading horns and fraight backs.

The climate of Lancashire is proverbially *wet*, and this feems a natural confequence of its peculiar fituation, between the broadeft part of the Irifh fea and the high ridge of hills which form its eaftern border. All this fide of the county is more fubject to rains than the fide bordering on the coaft; for as the clouds are wafed over the Irifh fea from the Atlantic ocean, they are firft checked and broken by the mountainous ridge, which has a direction north and fouth; and hence the rains are almoft perpetually falling on the weftern fide of thefe intercepting eminences. At Town-

ley, near Burnley, it has been found by experiment, that forty-two inches of rain fall annually, at a medium; while the annual fall at Manchester has been only thirty-three inches. At Liverpool the average has been confiderably lefs, while that at London has been ftill lower.

Lancashire fends fourteen members to parliament; two knights for the ftire, and two representatives for each of the boroughs of Lancaster, Liverpool, Prefcot, Newton, Wigan, and Clithero: one of the members for the county is returned through the intereft and influence of the earl of Derby; the other by what is termed the independent intereft. The county is included in the northern circuit, and the affizes are held at Lancaster, as are alfo the quarter-feffions.

This county, though not abundant in antiquities, formerly poffeffed a few caftles and monaftic buildings: *viz.* caftles— at Clithero, Gleanon, Holland, Hornby, Lancaster, Peefe, and Thurland. Religious houfes—at Burfough, Cartmel, and Coninghead. Auguline priory—at Cockerland; a Premonftratian abbey; Furnefs and Whalley, Ciftertian abbies; Holland, a Benedictine priory; Hornby, a Premonftratian priory; Lancaster, Latham, and Penwortham, Benedictine priories; Manchester, a college.

Lancashire contains 490 public bridges; of which nine are repaired by the county, and the others by the different hundreds.

The manufactures and commerce of this populous county, are both of great extent and importance. Many particulars refpecting the former have been already narrated under the article COTTON. Further details will be given under MANCHESTER, and the commerce of the county will be defcribed at LIVERPOOL. Beauties of England, vol. ix. Aikin's Hiftory, &c. of the Country round Manchester, 4to. Whitaker's Hiftory, &c. of Manchester, 2 vols. 4to. Whitaker's Hiftory of Whalley, 4to. Holt's Agricultural Report relating to Lancashire, 8vo.

LANCASTER, *County Palatine of*. See COUNTY.

LANCASTER, *Duchy Court of*. See COURT.

LANCASTER, in *Geography*, a fea-port, market, and the county town of Lancashire, England, is fituated on the banks of the river Loyne, or Lune, 239 miles diftant from London. Few of the county-towns in England have been more neglected by the hiftorian, or more inaccurately defcribed by the togographer, than this of Lancaster. That it was a Roman itation is evinced by the Saxon termination *cafter*, or *caftre*; and the fame is confirmed by the various remains of the domeftic economy of the Romans that are continually difcovered in the town and its vicinity. Camden contends that the Roman name of this place was Longovicium; and Mr. Whitaker afferts, it was the Ad-Alaunum of Richard of Cirencefter's Itinerary. Reynolds, in his "Iter-Britanniarum," identifies this place as the Bretonacis of Antoninus; but this is improbable; though we do not hesitate in confidering it to be the feite of one, if not both, the other names. Dr. Leigh, in his "Natural Hiftory of Lancashire, &c." defcribes and refers to various coins, pieces of pottery, burnt bones, &c. that have been found in this town. In 1772, an altar-ftone, with an infcription, was dug up here. In the Archæologia, vol. v. is a difertation, by the Rev. Mr. Leigh, on certain Roman veftigia belonging to Lancafter. This place was a fortrefs of confiderable confequence alfo under the Anglo-Saxon dynasty. Indeed it appears to have been the chief obftacle and barrier to the Picts, or Scots, in the progrefs of their conquefts in England. Having being demolifhed by thefe marauders after the retreat of the Romans, it lay a confiderable time in ruins, but was at laft rebuilt by the Saxons, who, foon

after their settlement in Britain, perceived the importance of this post, and the facility of defence afforded by its commanding site. That it was constituted the chief and designating town of the county, is a sufficient indication of its consequence. This event is stated by Mr. Whitaker to have occurred in the seventh century, when he observes, the "Roman Alanna received the honour which it retains at present, and was made the metropolis of the shire." During the Saxon heptarchy we have no records whatever of this town, but soon after the Norman conquest it assumes some historical consequence. In Domesday-book, however, Lancaster and Cherca-Longcaestre appear simply as two villas, or *Berwic*, among the twenty-two which then composed the manor of Halton. At this time there was no church at Lancaster, but the name Cherca-Longcaestre, affixed to one of the villages, renders it probable that it had a church during the time of the Saxons, which had probably been destroyed during the ravages of the Danes. Lancaster, it is likely, was granted either by the Conqueror or his successor, William Rufus, to Roger de Poitou, for the purpose of erecting a castle upon its hill. This person also founded the church of St. Mary, and granted it as a cell to the abbey of Sees, in Normandy. To this monastery it continued annexed till the abolition of alien-priorities, in the reign of Henry V. when it was given to the Carthusian abbey of Sion, in Middlesex, and remained attached to that institution till the general dissolution of monastic establishments by Henry VIII. The great tower of the castle, which is still standing, is an excellent specimen of the massive style of architecture adopted in that age. The walls are of uncommon thickness, and the buttresses have narrow projections, whilst the lower windows have short rounded arches, with single shaft columns on their sides. This castle was besieged by Hubert, archbishop of Canterbury, in the year 1199, at which time it was held by the brother of king John, in trust for that monarch when he came to the throne. In the seventh year of the reign of the same prince, it was in possession of Ranulph Blundevil, earl of Chester, and in the early years of the reign of Henry III. was held by William de Ferrars, earl of Derby.

Lancaster, however important it may have been as a military station, owes its chief celebrity to Edward III., who, upon the completion of the fiftieth year of his reign, solemnly, and in full parliament, created his third son, John of Gaunt, duke of Lancaster. By the charter granted at this period, the duchy of Lancaster was constituted a sort of petty kingdom, and all the privileges of royalty conferred upon the duke within the county. During the civil wars between the houses of York and Lancaster, this town suffered so much by its adherence to the Lancastrian line, that it was nearly depopulated, and even in the time of Camden was only the residence of a few husbandmen, Charles II. having confirmed its ancient charter with additional privileges, it began again to revive, and has ever since been increasing in trade, extent, and population.

The castle, which has successively been the safeguard, terror, and glory of the town, is now fitted up as the county-gaol, with its necessary appendages of a gaoler's house, prisoners' rooms, cells, work-shops, courts of justice, &c. From the appearance of its present remains, and the commanding situation on which it stands, it must, doubtless, have been a grand and magnificent object in former times. Much as it has suffered from the changes it has more recently undergone, its architectural features are still entitled to general admiration. The encircling walls embrace an area of 380 feet from east to west, by 350 from north to south. Within this space is a large court-yard,

with several of smaller dimensions, and a number of towers of various shapes. The chief entrance is towards the east, and communicates with the town. It is a strongly fortified tower gateway, consisting of two semi-octangular projections, which are perforated, near the bottom, with apertures for the discharge of arrows, and on the summit are several bold machicolations with embrasures, &c. Within this entrance is the large court-yard already mentioned, surrounded with towers and fortified walls, and on the opposite side is a large square keep, the walls of which are of amazing thickness, and its apartments of grand dimensions. One of the rooms is nearly sixty feet long, by about thirty in width. The floors are arched, and covered with composition, forming flat surfaces. From the summit of this tower, the views are very grand and impressive. To the north of the keep are the shire-hall and county-courts, with several apartments and offices connected with them. These have been recently erected at the expense of the gentlemen of the county, and from the designs of Mr. Harrison of Chester, an architect, who has displayed so much classical taste and scientific knowledge in the construction of a county-gaol in that city. The finishing of these works has been from the designs of Mr. Joseph Gandy, of London, an artist of eminent talents. The grand jury room here, and shire-hall, are peculiarly elegant and novel: the first being of circular form, and the second being semi-circular; but both finished with clustered columns, panelling, tracery, &c. partly in imitation of the elegant ecclesiastical architecture of the fifteenth century. Over the judges' seats are two full-length portraits of the county members, by Mr. Allen; and a full-length of George III. on horseback, by Northcote. This grand and spacious pile of buildings, whether viewed as an ancient baronial fortress, as a picturesque object, or as a suite of public structures for the gaol and courts of the county, must demand our admiration. An engraved ground plan of this castle is published in a small History of Lancaster, 8vo. 1807. On an eminence near it is the parish-church, a spacious building, with a lofty tower, which serves as a land-mark for vessels coming up the river. At the east end of the church is a wooden screen most elegantly carved. Among the monuments, is one by Roubiliac, for William Stratford, L. L. D. In the church-yard is the shaft of a stone cross, with carving, and an inscription in Runic letters.

The other public edifices of this town, are a town-hall, a chapel of ease to the parish church, a theatre, an assembly-room, a range of shambles, a Quakers' meeting-house, and chapels to the following classes of dissenters, Presbyterians, Quakers, Independents, and Methodists. An ancient bridge, now in ruins, connected the opposite shores of the Lune, near St. George's Quay, but the increasing opulence and population of the town rendered a new and more commodious one necessary. This was erected from the extremity of Cable Street to Skerton, at an expense of nearly 12,000*l.* paid by the county. The length of this superb structure is 549 feet; the arches, five in number, are equal and elliptical; the design was by Mr. Harrison. Among other benevolent institutions in this town are several alms-houses for men and women, a free-school for the education of 60 boys, and two charity schools for 50 boys and 40 girls. The manufactories of the town are inconsiderable, and chiefly consist of cabinet-making, spinning of twine, cotton-printing, and weaving of sail-cloth. Ship-building has been greatly encouraged, and many large vessels constructed, particularly by Mr. Brookbank, who has sent ships, launched at his dock-yard, to London, of 450 tons burthen. Lancaster trades to America with hard-ware and woollen manufac-  
tures,

tures; and a considerable quantity of candles is exported to the West Indies: 40 or 50 ships trade also to Norway. It appears from the Custom-house entries, that in the year 1799, 52 vessels cleared out for the West Indies, with cargoes to the value of two millions and half pounds sterling. The Custom-house is a small neat building, with a portico supported by four Ionic columns, fifteen feet in height, each a single stone. The Town hall is a large commodious edifice; in the council room is a full-length portrait of Lord Nelson, painted by Mr. Lonfdale, an artist of talents, who is a native of this town. He presented it to the corporation, who have also a similar portrait of Mr. Pitt. The borough of Lancaſter originated from a grant, made in the 4<sup>th</sup> of Richard I. and members were first ſent to parliament 23 Edward I. Returns were alſo made at various periods in the two ſucceeding reigns; after which there were none till the reign of Edward VI., when the privilege was reſtored. The corporation is compoſed of a mayor, recorder, 12 aldermen, two bailiffs, 12 capital burgeſſes, 12 common burgeſſes, a town clerk, and two ſerjeants. In the vicinity of the town is an excellent ſalt marſh, adjoining the banks of the Lune: this marſh is paſtured and divided into what are termed *ori graſſes*; that is, a privilege for the inhabitants of turning a horſe or two cows to ſummer on the common. By the late inland navigation, Lancaſter has communication with the rivers Merſey, Ribble, Oufe, Trent, Derwent, Severn, Humber, Thames, Avon, &c., which navigations extend above 500 miles, into the counties of Lincoln, Nottingham, York, Weſtmoreland, Cheſter, Warwick, Leiceſter, Oxford, Worceſter, &c. About one mile north-eaſt of the town is a grand aqueduct-bridge, which conveys the Lancaſter canal over the river Lune. This ſtupendous fabric was deſigned and ſucceſsfully executed by Mr. John Rennie, civil engineer, who has hereby diſplayed much ſkill and ſcience in this and ſeveral other ſimilar works. The bridge conſiſts of five circular arches, each of 70 feet ſpan, riſing 39 feet above the ſurface of the river. The peculiar difficulties which the architect had to encounter, in the bed of the river, made it neceſſary to have a foundation, a flooring of timber, which alone coſt 15,000*l*. The ſuperſtructure came to double that ſum.

In the return to parliament in the year 1801, Lancaſter is ſtated to contain 1611 houſes, and 9030 inhabitants. Markets are held on Wednesday and Saturday; and here are three annual fairs.

About three miles ſouth of the town is Aſhton Hall, the ſeat of the duke of Hamilton and Brandon. Two miles further is Thurham Hall, the ſeat of John Dalton, eſq. In the vicinity of the town are Quo Wyerfield, the ſeat of John Fenton Caſtborne, eſq.; Quermore Park, the ſeat of Charles Gibſon, eſq.; Graſs-yard Hall, the property of Thomas Edmondſon, eſq.; Halton Hall, the ſeat of W. B. Bradſhaw, eſq.; and Halton Park, the ſeat of Thomas Bate-man, eſq.

Five miles north of Lancaſter, is a cavern, called Dunald Mill-hole, of a peculiarly grotesque and awful appearance, which, probably, from its obſcure ſituation, has been but little noticed by topographers. An Hiſtorical and Deſcriptive Account of the Town of Lancaſter; with four engravings, 8vo. 1807. Beauties of England, vol. ix.

LANCASTER, a populous and wealthy county of America, in the interior part of Pennsylvania, extending S. to the Maryland line. It is about 42 miles ſquare, is divided into 25 townſhips, and contains 566,240 acres of land, and 43,303 inhabitants, including 178 ſlaves. The lands of this county are rich and well cultivated. The hills in the northern parts abound with iron ore; for the manufacture of

which two furnaces and eight forges have been erected, Copper and lead, and abundance of limellone, have been found here.—Alſo, a county of Virginia, bounded E. by Cheſapeak bay, and S.W. by Rappahannock river. It is about 40 miles long, and 15 broad, and contains 2249 free inhabitants, and 3126 ſlaves. The lands are generally poor.—Alſo, a diſtrict of South Carolina, containing 5012 inhabitants, of whom 1076 are ſlaves.—Alſo, a poſt-town in Gerrard county, Kentucky, 621 miles from Waſhington.—Alſo, a handſome and flouriſhing poſt-town, the capital of Lancaſter county, in Pennsylvania, and the largeſt inland town of the United States. It is pleaſantly ſituated upon the deſcent of a hill, 1½ mile W. of Coneſoga creek, which falls into Suſquehanna river, nine miles S. by W. of the town. Its trade is already great, and muſt increaſe in proportion to the increaſing population of the ſurrounding country. It contains about 900 houſes, chiefly of brick and ſtone. The legiſlature meet here till a permanent ſeat of government ſhall be eſtabliſhed. The public buildings are, a handſome court-houſe of brick, a market-houſe of the ſame materials, and a ſtrong ſtone gaol. Here are ſix places of worſhip for German Lutherans, German Calviniſts, Preſbyterians, Episcopallians, Moravians, and Roman Catholics. The manufactures of this town are carried on by individuals. There are three breweries, and two or three valuable tanneries. Franklin college is eſtabliſhed here for the Germans. Its endowments are the ſame as thoſe of Dickinſon college, at Carlisle. The truſtees conſiſt of Lutherans, Calviniſts, Preſbyterians, and Episcopallians, of each an equal number. The principal is a Lutheran, and the vice-preſident a Calviniſt; 58 miles W. by N. from Philadelphia. N. lat. 40° 3'. W. long. 76° 20'.—Alſo, a poſt-town of South Carolina, 36 miles from Camden.—Alſo, a pleaſant poſt-town in Worceſter county, Maſſachuſetts, ſettled in 1645, and incorporated in 1633. It is ſituated on two branches of Naſhua river, which runs into the Merrimack: over theſe branches are nine large bridges, and on their banks the land is excellent. Many perſons of education and fortune have been induced, by the pleaſantneſs of this town, to make it the place of their reſidence. It is famous for its abundant ſupply of good ſlates and of ſtones for tombs and graves, which are articles of exportation. Camberry pond in this town is obſerved to riſe as much as two feet before a ſtorm, and Sandy pond riſes in a dry ſeaſon. It contains 1584 inhabitants.—Alſo, a poſt-town in Graſton county, New Hampshire, on the E. bank of Connecticut river, about 41 miles above Hanover; incorporated in 1763, and containing, in 1800, 440 inhabitants.—Alſo, a fine town, the capital of Fairfield county, in the ſtate of Ohio, on a branch of the Hockhocking river, about 25 miles N.E. from Chillicothe.—Alſo, a townſhip of Upper Canada, in Glengury county, on the river St. Lawrence, and the loweſt in the province adjoining Lower Canada. Morſe.

LANCAT, a river on the N.E. coaſt of Sumatra, which runs into the Eaſt Indian ſea, N. lat. 4° 5'. E. long. 98° 2'.

LANCAVY, LANCAKUY, or *Pulo Lada*, an iſland in the Eaſt Indian ſea, near the coaſt of Queda; about 16 miles long, and from three to eight broad. N. lat. 6° 19'. E. long. 99° 40'.

LANCAYAN, a ſmall iſland in the Eaſt Indian ſea, near the N. coaſt of Borneo. N. lat. 6° 25'. E. long. 118° 9'.

LANCE, LANCEA, a ſpear, an offensive weapon, borne by the ancient cavaliers, in form of a half pike.

The lance conſiſted of three parts, the ſhaft or handle, the wings, and the dart. Pliny attributes the invention of lances.

lances to the *Ætoliæns*. But Varro, and Aulus Gellius say, the word lance is Spanish; whence others conclude the use of this weapon was borrowed by the people of Italy from the Spaniards. Diodorus Siculus derives it from the Gauls, and Festus from the Greek *λάνχη*, which signifies the same.

The lance, or spear, is among the oldest weapons recorded in history, and is nearly coeval with the sword or bow; it probably originated in a pole or stake, sharpened at one or both ends, afterwards armed with a head of flint, and in process of time, on the discovery and use of metals, with copper, brass, and iron. Flint heads for both spears and arrows are frequently found in England, Scotland, and Ireland, and so are also spear, javelin, and arrow heads of a metal nearly resembling brass. The spear, lance, javelin, darts of different kinds, and even the more modern pikes, are all comprehended under one common description of a long staff, rod, or pole, armed with a pointed head of stone or metal at one or both ends, constructed for the purpose of piercing, or wounding with their points only, either by being pushed or thrown with the hand. Long spears and lances were used by the Saxons and Normans, both horse and foot, but particularly by the cavalry of the latter, who, in charging, rested the butt end of the lance against the arçon or bow of their saddle; the mail-armor not admitting of the fixture of lance-rests, as was afterwards practised on the cuirass. A lance-rest was a kind of moveable iron bracket, fixed to the right side of the cuirass, for the purpose of supporting the lance. It does not appear that there was any established standard for the length or thickness of the ancient lances, or the size or form of their heads; but it rather seems, that every military man had his lance, as well as his other arms, constructed of the dimensions that best accorded with his strength and stature. It is certain, however, that the heads of lances and spears were always made of the best tempered steel, and their staves of the soundest ash, whence the writers of Latin verse used the word *fraxinus* (Latin for ash) to express a lance or spear. Although lances and spears were chiefly the weapons of horsemen, they were also used by the infantry and dismounted knights, to keep off the cavalry; for this purpose they fixed the butts in the ground, their points sloping towards the breasts of the enemy's horses. In tournaments, the knights sometimes fought on foot with their lances, in which case it was customary to shorten them, by cutting off part of the shaft. Tilting lances differed from those used in war, both in their heads and raves; the heads of tilting being blunt, or occasionally fitted with a contrivance to prevent penetration, called a coronel or coronel, from its resemblance to a crown. The staves were thick at the butt end, tapering off gradually to the point, and generally fluted; near the butt end they had a device for the reception of the hand. The front of it was defended by an iron-plate, called a vam-plat, that is, an avant-plate, and behind it was a broad iron ring, called a burr. These handles were not confined to the tilting lance, but were made also on those designed for war. Fauchet says, they were not in use before the year 1300. Lances were ornamented with a banderole near the point, which gave them a handsome appearance; these were also called pennells. Grose on Ancient Armour, vol. ii.

*LANCE, Holy*, the lance which, in legendary story, is said to have pierced the side of our Redeemer. In the time of the Crusades, when Antioch was besieged, a priest of the diocese of Marseilles, called Peter Bartholomy, pretended to have received from St. Andrew, during his sleep, the following instruction. "At Antioch," said the apostle, "in the church of my brother St. Peter, near the high altar, is

concealed the steel-head of the lance that pierced the side of our Redeemer. In three days that instrument of eternal, and now of temporal salvation, will be manifested to his disciples. Search, and ye shall find; bear it aloft in battle; and that mystic weapon shall penetrate the souls of the miscreants." This revelation was respectfully received by count Raymond, whom his faithful subject, in the name of the apostle, had chosen for the guardian of the holy lance. After some previous ceremonies, the ground was opened at the appointed place; and search was unsuccessfully made for the lance. After the count and his companions had withdrawn, the artful priest descended into the pit; and, availing himself of darkness and solitude, contrived to secrete and deposit the head of a Saracen lance; and the first gleam of the steel was saluted with a devout rapture. The holy lance was drawn from its recess, and exposed to the veneration of the crusaders, and we may well imagine that the depending troops would again be inflamed with the enthusiasm of valour. Preparation was made for a conflict, and it may be supposed that the potent energy of this relic or trophy, aided by another miraculous delusion, would ensure victory. In the season of danger and triumph, the revelation of Bartholomy of Marseilles was unanimously asserted; but as soon as the temporary service was accomplished, the personal dignity and liberal alms which the count of Thoulouse derived from the custody of the holy lance, provoked the envy, and awakened the reason of his rivals. Incredulity, with regard to the truth of the legend, succeeded suspicion and examination, and the author was obliged to submit his life and veracity to the judgment of God. A pile of dry faggots, 4 feet high and 14 long, was erected in the middle of the camp; the flames burnt fiercely to the height of 30 cubits, and a narrow path of 12 inches was left for the perilous trial. The unfortunate priest of Marseilles traversed the fire with dexterity and speed; but his thighs and belly were scorched by the intense heat; he expired the next day, protelling his truth and innocence. Such were the origin, influence, and termination of the legend of the holy lance. Gibbon's Hist. vol. xi.

*LANCE la Grace*, in *Geography*, a town of Louisiana; 75 miles S.S.W. of New Madrid. N. lat. 35° 25'. W. long. 90° 27'.

*LANCE'S Bay*, a bay on the N.W. coast of Jamaica. N. lat. 18° 27'. W. long. 78 14'.

*LANCEA CHRISTI*, in *Botany*, a name given by some authors to the *ophioglossum*, or adder's tongue, a small herb found in moist places, with a single stem of seeds.

*LANCEARII*, in *Middle Age Writers*, soldiers whose chief weapon was the lance. They were in great esteem formerly.

*LANCEBEARERS*, *Island of*, or *Isle des Lanciers*, in *Geography*, a small island in the S. Pacific ocean, so named by M. Bougainville, in 1768. S. lat. 18° 28'. W. long. 138° 10'.

*LANCELOTTI, GIANPAOLO*, in *Biography*, an eminent jurist, was born at Perugia about the year 1510. He was first noticed as a teacher of the law at his native place, and was engaged by pope Paul IV. to draw up an institute of canon law, in imitation of Justinian's Institutes of civil law. This was published in 1563; and went very quickly through several editions. It was annexed to the body of canon law, and still retains its place in the modern editions of that compilation. He was author of other treatises on legal subjects, and of a life of Bartolus. He died at Perugia in 1591. Moreri.

*LANCELOT, CLAUDE*, was born at Paris in 1615; at a fit age he was persuaded to join the devout solitaires of

the Port-Royal, by whom he was employed in teaching mathematics, and the languages in their schools, till government thought proper to suppress them. He was afterwards appointed tutor to the young princes of Conti, but upon the death of their mother, he took the habit of St. Benedict, in the abbey of St. Cyran. In 1680, he was exiled to Quimperlé, in Lower Brittany, where he continued the same ascetic course which he had been used to in the seminary. He died in 1695. He was author of many excellent works, among which may be noticed "Nouvelle Methode pour apprendre la Langue Latine;" "Nouvelle Methode pour apprendre la Langue Grecque." These have been frequently reprinted, and abridgments have been made of both. His "Grammaire generale et raisonnée," is said to be a very excellent work, and has been translated into several languages.

**LANCEOLA**, in *Botany*, a name given by some authors to that species of plantain called *rib-wort*, or *plantago quinquerivra*, by most authors.

**LANCEOLATED LEAF**. See **LEAF**.

**LANCEROTTA**, in *Geography*, one of the Canary islands, about 30 miles in length, and eight in its greatest breadth, containing 800 inhabitants. It is divided by a ridge of mountains, which afford nothing but pasture for cattle, though the vallies are fruitful, but sandy and thin in soil. A principal article of trade is goat's flesh, which the inhabitants sell to the neighbouring islands, under the name of Tuffinetta. In 1730, a volcano broke out in this island. Cayas, called also Rubicon, and Lancerotta, the principal town, contains about 200 houses. The island has several havens or roads; and at the N.E. extremity is one, where ships may come in from the northward, and lie land-locked from all winds in 10, 15, and 20 fathoms. The E. point of the island is in N. lat. 29° 8'. W. long. 13° 26'.

**LANCET**, a well known surgical instrument, the common form of which is represented in the plates of this work. See the Surgical Plates.

**LANCET Arch**, in *Architecture*, the same as the pointed arch.

**LANCET Windows**, those with lancet arches; but the term is more generally applied to windows which are long and narrow, than to those which are wide and low.

**LANCETI**, a name given by the ancient laws of England to a kind of vassals, who were obliged to work for the lord one day in a week, from Michaelmas to autumn, either with fork, spade, or flail, at the option of the lord.

**LANCH** is a sort of long boat belonging to ships; it is not built upon sailing principles, it being flat-bottomed and broader, and is more useful for weighing small anchors than the long boat, and watering and carrying the ship-flores.

**LANCH of a Ship**. See **LAUNCH**.

**LANCHE**, in *Geography*, a town of Anterior Pomerania; 11 miles S. of Bergen.

**LANCIANO**, a town of Naples, in Abruzzo Citra, of which it is the capital; the see of an archbishop; S4 miles N. of Naples. N. lat. 42° 12'. E. long. 14° 20'.

**LANCIEGO**, a town of Spain, in the province of Alava; 18 miles S.S.E. of Vittoria.

**LANCISI**, **JOHN-MARIA**, in *Biography*, a celebrated physician, was born at Rome in October 1654. His parents were rather low in rank, but cherished the disposition for learning which he early displayed; and having finished his classical studies, he went through the course of philosophy in the Roman college, and then commenced the study of divinity. He had always evinced a great taste for natural history, which was so strongly awakened during his theolo-

gical researches, that it induced him to abandon the study, and apply himself entirely to that of medicine. He pursued the fundamental branches, anatomy, chemistry, and botany with great ardour, as well as the more important object, the observation of diseases; and was created doctor in philosophy and medicine in 1672. In 1675, he was appointed physician to the hospital of the Holy Ghost, in Saffia, where he pursued his clinical enquiries with great accuracy and acuteness: but he quitted this situation in 1678, when he was received a member of the college of St. Saviour, in Lauro, where he read with zeal all the best authors from Hippocrates downwards. His talents and achievements were now known and acknowledged, and he was appointed professor of anatomy in the college de la Sapienza, in 1684, and continued his duties as a teacher for thirteen years with great reputation. In 1688, pope Innocent XI. chose Lancisi for his physician and private chamberlain; and some time afterwards gave him a canon's stall in the church of St. Lawrence: but on the death of the pope, in 1689, he resigned it. He was now in high public estimation, and when Innocent XII. fell sick in 1699, Lancisi was called upon, and was never absent from him during his whole illness. He was elected physician to the conclave, and was immediately appointed first physician and private chancellor to the perion of the succeeding pope Clement XI. He was indefatigable in the discharge of all his duties, as well as in the pursuit of his studies, reading and writing at every interval of leisure, and in his attendance on the learned societies of the time. He died in January, 1720, at the age of 65. He was a man of small stature, with a lively countenance, and cheerful disposition; his manners were extremely engaging; and he was possessed of much knowledge of mankind. His ardour for the advancement of his art was extreme and unceasing. He collected a library of more than twenty thousand volumes, which he presented in his life-time to the hospital of the Holy Ghost, for the use of the public, particularly the young physicians and surgeons who attended the patients in that hospital. This noble benefaction was opened in 1716, in the presence of the pope, and a great number of cardinals.

Lancisi left a considerable number of works, many of which have been printed, but several in MS., which he bequeathed to the hospital, and which are deposited in its library. Among his lesser productions, were a synopsis of anatomy; an epistle to Fantoni on the same subject; an epistle to Bianchi on the secretion of the bile; an essay on the atmosphere and climate of Rome; on physiognomy and the seat of the soul; on the proper method of studying in medicine; on the origin and structure of fungi, in a letter to count Marfigli; and some others, in the Latin language; and also an address to the academy of Sienna, "Del modo di filosofar nell' Arte Medica." His more important works are his treatise "De subitaneis mortibus, Libri duo," Romæ 1707. — "Tabule Anatomice Clariss. viri Bartholomæi Eustachii, quas à tenebris tandem vindicatas, et sanctiss. Dom. Clementis XI. Pontif. Max. munificentia dono acceptas, præfatione notique illustravit," ibid. 1714, folio. — "Dissertatio Historica de Bovilla Peste ex Campinjs finibus, anno 1713, Latio importata. Accedit Consilium de Equorum Epidemia," ibid. 1715. — "De noxiis Paludum Effluviis, Libri duo," ibid. 1717. — He likewise edited, in the same year, under the patronage of the pope, a posthumous work of Michael Mercati, entitled *Metallotheca*, with plates; and afterwards published, "Appendix ad Metallothecam Vaticanam Michaëlis Mercati," 1719. After his death, a treatise, "De motu cordis et aneurysmatibus," was printed in folio at Rome, 1728: — and a collection of cases from his MSS.

MSS. in the library of the hospital, entitled "Confilia XLIX posthuma," Venice, 1747. All his works, with the exception of the two last, were collected in his life-time, and printed at Geneva, with the title of "Joannis Maria Lancisi Opera quæ hæcenus prodierunt omnia, Dissertationibus nonnullis adhuc ineditis completata," 1718; which, as well as most of the separate treatises, have passed through several editions. Eloy Dict. Hist.

LANCISIA, in *Botany*, so named by Pontedera, in honour of John Maria Lancisi, physician to pope Clement XI. Ponted. Diff. 203. Lamarec. Illustr. t. 701. See LIDBECKIA.

LANCKAW, in *Geography*, a town of Prussia, in the palatinate of Culm; 10 miles E.N.E. of Thorn.

LANCKE, a town of Prussia, in Pomerelia, on the borders of Pomerania; 32 miles N.N.W. of Fredeland.

LANCPOU, a lake of Thibet, about 30 miles long and nine wide. N. lat. 32° 36'. E. long. 84° 32'. — Also, a mountain of Thibet. N. lat. 32° 55'. E. long. 84° 34'.

LANCTAN, a mountain of Thibet. N. lat. 31° 52'. E. long. 85° 54'.

LAND, in a general sense. See EARTH, SOIL, &c.

Dr. Davenant, from a scheme of Mr. King, states the quantity of land in England and Wales to be thirty-nine millions of acres; which, reckoning the number of inhabitants, as he does, to be 5,500,000, will at an average be 7½ acres per head. Davenant's Works, vol. vi. § 3. See ACRE, and EXPECTATION of Life.

LAND, in a legal sense, includes not only the face of the earth, but every thing under or over it; so that if a man grants all his lands, he grants thereby all his mines of metal and other fossils, his woods, his waters, and his houses, as well as his fields and meadows.

LAND, in *Agriculture*, the earth or soil in which plants fix themselves and grow, or which produces crops of different kinds.

It is stated in an able work on the landed property of England, that "land, viewed in the light of agriculture, is the foundation on which it rests, the materials on which it operates, and the visible source of its productions. And that it may generally be considered as being composed of three distinct parts; the soil, the sub-soil, and the base, or sub-structure, on which they rest." It is added, that "the soil, or plant-feeding stratum, is not more various in quality than it is in depth. The soils of cultivated lands, however, have their limits as to depth. These limits may, it is conceived, be fixed at three and fifteen inches. For although, in many instances, the component parts of land are pretty uniform, to a greater depth than fifteen inches, a uniformity of colour and vegetative quality seldom reaches to that depth. The influence of the atmosphere, the fibres of vegetables living and decayed, the operations of animalcules, and larger animals, that inhabit soils, and, above all, the powerful effects of manures, tend to furnish the surface mould with qualities which the substrata have not the means of acquiring. The medium depth of cultivated soils, in England, may, it is imagined, be set down, with sufficient accuracy for this purpose, at nine inches. For although a majority of the cultivated soils of the kingdom may not reach that depth, the writer is of opinion that the major part of them might, under proper management, be sunk to nine inches deep, with advantage in many respects." See SOIL.

And it is further stated, that "the subsoil, or intervening stratum of land, is still less definite with regard to depth. In some instances, as where the cultivated soil rests upon rock, it may be said to be wanting; though, in most cases of this kind, a stratum of a gravelly nature, composed of broken

rock and earth, is found between them. And in many cases, a regular bed of gravel, sand, or other earth, intervenes between the soil and the substructure. While in others, an uniform mass of earthy materials reaches to a great depth. If, therefore, a definite thickness, or depth, may be assigned to the subsoil, it must be, in a degree, arbitrary," or without any degree of accuracy or correctness.

It seems evident, that "the soil affords nourishment and stability to agricultural plants, and that the subsoil assigns them temperature, with respect to moisture and internal warmth. If the subsoil is of such a nature, or is so situated as to receive and retain more moisture than is requisite for the natural growth of plants, their health is injured. If it not only holds water in its own pores, but freely communicates it to those of the soil, the more valuable plants in agriculture give place to ranker herbage, let the surface soil be what it may. On the contrary, if an open stratum of sufficient depth intervenes between the cultivated soil and the base, to permit the superfluous moisture which filters through the soil, or which is communicated subterraneously, to pass off, the plants in cultivation will be relieved from collected moisture, in the immediate region of their feeding fibres; though the substructure may be charged to the fill with water. Hence, where nature has not furnished land with this valuable interstratum, it is the business of art to remedy the defect," in some way or other, and which in general "is to be done by draining off the superfluous moisture to a sufficient depth to prevent its evil effects on the soil, and thereby supplying the required stratum." It is however well observed, that "in doing this, the artist must be led by the given properties of the base, and can seldom lower it to any determinate or arbitrary depth. Nevertheless, it will be right, before he proceeds further, to endeavour to form an adequate idea of the medium depth required;" in doing which, much, he says, depends on the specific quality of the subsoil. Sand will hold up water that is lodged at its base to a much greater height than gravel. A stratum of gravel of one foot in depth forms a drier subsoil, than a bed of sand of twice or three times that thickness. But clean sand or gravel is rarely found in land; sand and gravelly loams being the more ordinary materials of absorbent subsoils: and these are capable of raising and holding up water to a considerable height. "Let us, therefore, admit that effective subsoils may vary from one to two feet, and fix the medium depth at eighteen inches." And "by thus fixing the mean depth of soils at nine inches, and that of subsoils at eighteen inches, place the base or substructure of the land at twenty-seven inches beneath its surface; which is a depth of land that is equally conformable with theory and with practice. To this depth drains may be sunk, at a moderate expence: and covered stone drains of this depth may be rendered effectual, yet free from injury by the operations of tillage. In the practice of skilful workmen, the depth of ordinary subsoil-drains varies from eighteen inches to three feet, according to the circumstances of the given case, and the method of draining employed."

After this general view of the component parts of land, and of their due arrangement, the common varieties of it, as they are given by soil, subsoil, and base, may be enumerated and considered. In the execution of which it may be proper to divide lands into classes, and mark the varieties of each.

*First Class*.—This comprehends, according to the above writer, such lands as are liable to surface water only with their absorbent strata (if any) open, so as freely to discharge the superfluous water they receive upon them: the varieties

of which are first, where "the soil, the subsoil, and the base are repellent, or in a state of moistness, impenetrable by water, as clay and strong deep clayey loam." The second, where "the soil is repellent, the subsoil absorbent, the base repellent." The third, where "the soil is repellent, the subsoil and base absorbent, or in a state of moistness, conducting water; as sand, gravel, open rock, and the lighter more open loams." The fourth, where "the soil, the subsoil, and the base are absorbent." The fifth, where "the soil and the subsoil are absorbent, but the base repellent." And the sixth, where "the soil is absorbent, the subsoil repellent, and the base absorbent or repellent."

*2d Class.*—This includes such lands as are liable to surface-water only, with their absorbent strata closed, or permitting an imperfect discharge, either for want of sufficient descent, or by reason of impervious strata, or beds of impenetrable materials. The varieties of which are, first, where "the soil is repellent, the sub-soil absorbent, and the base repellent or absorbent." The second, where "the soil and the sub-soil are absorbent, but the base repellent, or absorbent." The third, where "the absorbent and repellent strata, or masses, are thrown together irregularly; or not disposed in regular strata, which correspond with the surface," or upper part.

*3d Class.*—This comprises such lands as are liable, not only to surface-waters, but to those which are subterranean, and which either descend from higher grounds in their respective neighbourhoods, or rise beneath them from subjacent reservoirs; the absorbent strata of this class being closed, and thereby rendered retentive, as in the second class, or kind of land. The varieties of which are, first, where "the soil is absorbent or repellent; the sub-strata absorbent and closed, and uniformly charged with descending waters, by an even stratum of gravel, free-sand," or some other similar material. The second, where "the same soil and sub-strata are partially charged with descending waters, through veins of sand or gravel, or fissures of rock, &c." The third, where "the soil is repellent or absorbent, the sub-soil absorbent and closed, and uniformly charged with descending waters; the base repellent, with a sub-base freely absorbent and open." The fourth, where "the soil is absorbent or repellent, the sub-strata uniformly absorbent and closed, and charged with rising waters." And the fifth, where "the soil is repellent or absorbent, the sub-strata complex and closed, and charged with rising and descending waters."

It may be observed, that the nature of these different kinds, or classes of lands and their varieties, with that of their different constructions, the effects to which they are each particularly exposed from a superabundance of water, the methods of removing such wetness, both with the view of ameliorating the lands for the purposes of cultivation, and that of providing supplies of water for economical uses, as the working of light machinery, the consumption of pasturing-stock, and in particular cases, where a sufficient quantity can be procured, for the watering of land, will be fully considered in their proper places; and many useful observations may be found in the work here alluded to, especially in what relates to draining. The two objects of applying water to the use of live-stock, and that of irrigation, should constantly be kept in the mind of the improver of the soil. See *SOIL, WATERING of Land, and DRAINING of Land.*

It is sufficiently evident, from various circumstances in the management of lands, that some sorts are much better calculated for the production of grain crops than those of the grass kind; while, on the contrary, others are much more suitable and better adapted to the raising of grass than those of the corn kind; and that there are still others that may

be cultivated under a convertible system of corn and grass, with more success than either of the methods separately.

It may be remarked, that all those lands which possess a sufficient degree of dryness, whether they have much depth of mould or not, and which, in their natural state, have but little tendency to produce good herbage, such as those covered with different sorts of coarse plants and vegetable productions, whether in an open or inclosed state, are proper for tillage. And it has been well observed by Mr. Davis, that grounds of this nature are of considerably more value when in a state of tillage than in pasture; as they are particularly adapted to the improved methods of cultivation, and in addition to the quantity of grain to be produced from them, will afford a greater quantity of vegetable food for animal stock, when in a tillage state, than they did when kept entirely in that of pasture or sward. The same writer likewise states, that there are various other descriptions of light lands that may be kept in a state of tillage with more advantage than in that of grass, as they are peculiarly suited to those improved modes of cultivation that are necessary for raising large supplies of green-food for the support of live-stock of different kinds. That the poorer sorts of sand-lands, where marl, clay, chalk, or other similar substances, can be readily procured, are much more proper for the purposes of tillage than those of grass, is sufficiently shewn by the improvements that have been made in many of the more southern districts of the kingdom. And that lands of the chalky kind, whether of the more superficial or deep descriptions, are, in most cases, better suited for tillage than grass, is proved from their wetness in the winter season, and their openness and friability in the summer, rendering it almost impossible to establish good herbage upon them. Beside these, there is another sort of land that is better for the purposes of tillage than those of grass, which is that which, in the state of grass, is constantly so disposed to the production of moss, as to afford but a very scanty share of good herbage in any circumstances.

It has been stated by the author of "Practical Agriculture," that "moist of the clayey and more heavy descriptions of land, especially when situated in vallies, or other low confined exposures, though they may be capable of affording good crops of particular kinds when under the plough, as those of the wheat and bean kind, are, on account of their retention of moisture, the increased expences of labour, and the uncertainty of season for tilling them, as well as their inaptitude for most other sorts of crops, and their fitness for the production of good herbage, much more beneficial in the state of grass than in that of tillage. When there is an opportunity of procuring sea-sand, and of applying it at an easy expence, they may, however, it is observed, be converted to the purposes of tillage in a profitable manner. Most of those strong cold grass-lands which, in a state of tillage, would be improper for the growth of turnips, and other applications of improved cultivation, should also constantly remain in a state of grass. And likewise those lands that are situated near large towns, where manure is plentiful, and, of course, capable of being procured at a reasonable rate; and where the produce of such lands is always in great demand, and therefore capable of being disposed of to great advantage. Such lands as are situated on the banks of large rivers or brooks, which are capable of being improved by means of watering, are likewise more beneficial when kept constantly under the grass system than any other mode of cultivation that can be practised. The lands of a calcareous nature, which are distributed in the vallies of the more mountainous districts, where old grass-land is scarce, and of much importance, and most part of that in the state of tillage incapable of being converted to the condition

of good grass, may also, it is believed, be the most advantageous when continued in a permanent state of herbage."

But that "the sorts of lands that are the most adapted to the practice of convertible husbandry are those of the loamy kinds, which are not too strong for the growth of turnips. These, in all their different varieties, are capable of being changed from the state of tillage to that of grass, and the contrary, not only without sustaining any injury, but frequently with the most evident advantage, as the practice of some of the western and midland districts has fully proved." And "the richer kinds of sandy lands are, in most cases, also well suited to this sort of husbandry; especially where marl is at hand, to be applied at the time of laying them down to grass. Grounds of the peaty sort may likewise, in many cases, be the most beneficially employed in this mode of culture, as, from their producing little else than plants of the aquatic kind, it is obvious that they must be completely destroyed, and those of the proper grass kind be introduced, before any useful herbage can be produced. And this is capable of being accomplished in by much the most perfect manner under the state of tillage. But as they are, in most instances, much too tender and moist for the purpose of remaining long in the state of tillage, as soon as the above intention has been fully effected, they should be restored to the state of permanent grass," either as meadows or pasture-lands. See **GROUND and SOIL**.

**LAND Carriage**, in *Rural Economy*, that sort of conveyance which is performed on land, which, in many cases, is highly inconvenient, and always greatly expensive and troublesome to the farmer. It should, of course, be lessened as much as possible, in situations that will admit of it, by the substituting of water-conveyance, by the forming of small narrow canals, which may, in many instances, be done at a trifling expence, and thus much lessen the extent or distance of land-carriage. Much has been done in this way, with considerable effect, within the last twenty-five years, in different parts of the country. See **CANAL and INLAND Navigation**.

**LAND-Guard**, a sort of fence or embankment constructed of stones, wood, or other materials, on the borders of rivers and brooks, in order to prevent their overflowing and carrying away the land. The cases in which they become more particularly necessary, are where they are confined in the parts where they are required to bend, by rocks or other means, to an unaltered channel; it often takes place in hilly situations, and where deep pools occur in such parts at low water, so as to render it difficult or impossible to provide a good foundation for a pier. The mode of applying and forming these sorts of guards, will be explained in considering the nature and manner of guarding river-banks, and confining streams of other kinds. See **EMBANKMENT, and RIVER-BANKS, Guarding of**.

**LAND Mark**, in *Agriculture*, any thing placed as the division of land. These marks were formerly chiefly used for shewing the different lots or divisions in common field-lands, and other sorts of commonable land.

**LAND-Reeve**, in *Rural Economy*, a person whose business it is to overlook certain parts of a farm or estate; to attend, not only to the woods and hedge-timber, but also to the state of the fences, gates, buildings, private roads, drift-ways, and water-courses; and likewise to the stocking of commons (where there are any), and encroachments of every kind; as well as to prevent, or detect waste and spoil in general, whether by the tenants of the estate, or others; and to report the same to the manager or land-steward. It has been observed, that "the utility accruing from these inferior officers of an estate occurred to the writer in the Highlands of Scotland; where they have been commonly appointed on every estate, it is believed, from time immemorial, under the name of

ground-officers." And he has "since experienced their utility so fully in England, as to induce him to recommend their appointment on every large estate; not merely as help-mates to the acting-manager, but as authentic evidences in matters of dispute, and as intelligent informants to a proprietor in going over, or inquiring after, the affairs of his estate. Active intelligent tenants, of known integrity, are generally the most suitable persons for having the management of this sort of trust confided in them."

**LAND Springs**, such as rise, or are produced in lands, at some considerable depth, from the water being obstructed in its descent by some sort of impenetrable material, such as clay, &c., and thus forced up to the surface, where it breaks or oozes out, having different appearances, according to the nature of the soil and situation in which it occurs. See **SPRING, and DRAINING of Land**.

**LAND Steward**, the common name of a person who overlooks, or has the management of a farm or estate. The number, description, and qualities of land stewards must be regulated according to the nature and extent of the property, and the particular circumstances of the proprietor. In order to be fully qualified, according to the author of "The Modern Land Steward," for the proper management of large estates, the stewards should have attained that thorough and correct knowledge of the business of life, that full-tried experience in men and things, which ought not to be expected earlier than the middle age. No material part of their time or attention should be engrossed by their own private concerns, as, in such cases, they must evidently neglect their own, or the business of their employers; and it would be paying human nature too great a compliment to suppose the former. To an ample share of agricultural knowledge, they ought to have a thorough insight into the nature of every improvement of which estates may be capable, whether upon or beneath the surface; or from its local situation, whether inland or upon the sea-coast. Their attention should be also directed to the useful sciences of political economy and political arithmetic, as there is a strict and happy coincidence between public and private wealth. They should be well versed in, and qualified to superintend, the culture of waste lands, the disposal of timber, the eradication or planting of woods, irrigation and warping, drainage, embankment, and the recovery of land from the sea, the cutting of canals, the laying out and repairing of roads, the construction of bridges, mills, and engines; and be possessed of a considerable skill in rural architecture of every kind. Nor is it less necessary that they thoroughly comprehend the nature of all the various methods in which money business is transacted; together with the advantage of bargaining in the purchase or sales of estates. Their intelligence ought also to extend to the valuable inventions and improvements of other countries, as well as those of their own; which, whether in the mechanic or agricultural relation, they should use their best means to introduce, and fairly experiment upon the estates under their care, with the honourable and patriotic views both of private and national benefit. In short, with sufficient honesty, a mind amply replenished, a cool, deliberate, and calculating head, a quick discernment, they should lay hold of every occasion, as it springs, to enhance the worth, the reputation, and the embellishment of the property committed to their charge.

For these qualifications and endowments they should have full and adequate allowances, in the way of salaries or wages, according to the service to be performed. Their practical skill in agriculture should particularly extend to the management of cattle, and the common outlines, at least, of rural architecture, as far as regards repairs, or ordinary new erections; and they should be thoroughly masters of common

accounts, and able to describe or correspond by letter intelligibly, and with propriety. When thus qualified, they may make very capable and respectable stewards; but they would not be the less eligible for a sufficient portion of mathematical and mechanical knowledge, and the practical habits of mensuration both of timber and land: though a defect of these branches of science ought not to operate to the rejection of those otherwise well qualified; since they are acquired by a very moderate application and practice; and since there are always at hand professional men in these sciences, whose services are, perhaps, after all, the most eligible and proper. Land stewards should have the care and management of every thing that relates to the farm or estate, of which they have the superintendance. It is also further advised, that "every estate should be accurately surveyed, and correctly described in a map, of which the tenant also should have one. It is supposed particularly necessary, both to steward and tenant, to keep an exact terrier of all common fields; and where the bounds and abutments of any single parcel of land are dubious, to have them defined and ascertained with durable land-marks, by a jury purposely impanelled at the manor-court: and in order to preserve the bounds and precincts of a parish, with the particular property of the lord, entire, and free from encroachment, and to preclude the necessity of quarrels and suits at law, it is good to keep the ancient custom of annual perambulation." And it is considered as "the duty of stewards to ride over, and make actual personal surveys of the estates in their trust, sufficiently often to offer timely advice, to obviate any dangers, and nip any irregularities or encroachments in the bud: to have in their possession duplicates of all leases, covenants, deeds, &c." And that, "where the case of default or danger does not admit of immediate remedy through their own means," to exonerate themselves by instant application to their employers.

And it is likewise their business "to inspect all repairs, that they be duly and substantially performed; fencing regularly kept up, according to covenant; ditches cast and scoured, water-courses free, and common rights fairly enjoyed, according to the custom of the manor; the larger tenants not overtocking, to the prejudice of the inferior: in which case, the stewards are bound to interfere.—To observe that the cutting of underwood be at the regular, customary, or covenanted periods; that the lopping of pollards be fair, and no damage done, in any wise, to the proprietor's timber or woods; to mark the spots where new plantations may be necessary or advisable; woodwards to be admonished of their duty,—that they report all persons who trespass, either with their cattle, under colour of cutting up hand-sticks, faggot-bands, or similar pretences." And "to discourage poaching and destruction of the game, rather by rational and moderate indulgences, than either by the threat or exertion of the excessive rigour of the law, which, according to the complexion of the present times, can have no other possible effect than to detract from the popular character of the proprietor, and from the safety of that which such measures are intended to ensure." Further: "to caution the tenants that they do not suffer the land to be overrun and rutted up by moles, or the commons or woodlands by unrung swine." And that "the strictest caution be observed, that all materials produced by the farm or estate, in any respect fit for manure, or other useful purpose, such as marle, lime-stone, coal, or kelp-ashes, weeds, shells, sand, clay, virgin-earth, &c. be disposed of and used among the tenants of the estate only, and by no means alienated from it; since such practice would be to rob the soil of a natural and most valuable mean of improvement."

It is, on the whole, concluded, that "there is great convenience in land stewards being surveyors of the highways for the parishes in which they reside; in which case, it lies in their own power to preserve them in a condition creditable to the county and the proprietors for whom they act. Nor ought they ever to be inattentive to the conduct of the surveyors of other parishes, in which they are concerned; never permitting the least neglect, nuisance, decayed bridge, or dangerous way; but occasionally, and according to the necessity of the case, making a few examples in a genteel and temperate, but firm tone, always pleading for their punctiliousness, the strict and peremptory orders of their employers, which they dare not disobey." And "the like strictness is, it is supposed, necessary with respect to trespasses from neighbouring cattle; for some farmers are so excessively dilatory in this respect, that they will take no kind of pains either for the security of their own or their neighbour's crops."

It is remarked by the writer of the work on "Landed Property," that on a large estate a resident manager is generally found,—a land steward, a man who has some knowledge of what is termed country business, and who acts under the controul of his employer, or of a confidential friend who is more conversant in rural concerns, or perhaps of a law-agent who knows less of them: and that such residing steward, especially of a detached estate, which lies at some distance from the residence of its proprietor, acts without controul. In this case, if he is a man of judgment and integrity, he becomes, at least in the eyes of the tenantry, a superior being; frequently, in their minds, a more exalted character than their landlord,—than the proprietor himself, who, perhaps, never deigned to glance his eye upon them or their lands." But that, "on the contrary, if such possessory manager wants those requisite qualifications, the consequence becomes mischievous to the lands, their occupiers, their proprietor, and the community. If this unprincipled agent has an interest in the derangement of the estate, and the ruin which will follow, and is suffered to make use of it,—the crime of neglect, on the part of the proprietor, might well be cognizable as a crime against the public." And further, that "similar evils are liable to befall an estate which lies round the residence of its proprietor, if he is equally inattentive" to its proper management and regulation.

Agriculture is considered as the oily firm foundation on which the other acquired attainments can be securely reposed. It is not more essentially valuable in the superintendance, than in the improvement of an estate. "It is difficult to become an accurate judge of the value of lands, without a practical knowledge of their uses: nor can any man, without it, properly appreciate the management of occupiers; much less assist them in correcting their errors, and improving their practice." And that "land surveying is another requisite qualification: not so much, however, for the purpose of mapping and measuring an estate at large, as for checking and correcting the works of professional men; as well as to assist in laying out its lands to the most advantage," and with the greatest propriety. Further: that "some knowledge of mechanics, and the other sciences that are requisite to the business of an engineer, may be highly useful in prosecuting the improvements incidental to landed property, in various ways; as well as a competent knowledge of rural architecture, and the superintendance of artificers, as they may be said to be of daily use. The nature of planting, and the management of woodlands, are acquisitions that cannot be dispensed with. Nor should his knowledge and attention be confined to the surface of the

pasturage by consequence. The ordinance was, that all houses of husbandry, with twenty acres of ground to them, should be kept up for ever, together with a competent proportion of land to be occupied with them, and in no wise to be severed from them. By these means, the houses being kept up, did, of necessity, enforce a dweller; and the proportion of land for occupation being also kept up, did, of necessity, enforce that dweller not to be a beggar. This statute was renewed in king Henry the Eighth's time; and every person who converted tillage into pasture subjected to a forfeiture of half the land, till the offence was removed. In a law of the 25th of the same reign, it is set forth, that many farms, and great plenty of cattle, particularly sheep, had been gathered into few hands, whereby the rents of lands had been increased, and tillage very much decayed; churches and towns pulled down; the price of provisions greatly enhanced, and a marvellous number of people rendered incapable of maintaining themselves and families; and, therefore, it was enacted, that no person should keep above two thousand sheep, nor hold more than two farms. In the third of Edw. VI. a bill was brought in for the benefit of the poor, for re-building decayed farm-houses, and maintaining tillage against too much inclosing. In the year 1638, there was a special commission from Charles I. for enforcing the statute of the 30th of Elizabeth, by which no cottage was allowed in any country place, without at least four acres of land to it, to prevent the increase of the poor, by securing to them a maintenance; nor were any inmates allowed in any cottage, to secure the full cultivation of the land, by diffusing the people more over it. And by an act in Cromwell's time, no new house was to be built within ten miles of London, unless there were four acres of land occupied by the tenant. Thus did the policy of our ancestors discourage inclosing and engrossing, upon the same general view of their depopulating tendency; and though the increase of trade and manufactures in more modern times has produced a considerable alteration in the state of our country, and may require some change in our internal policy, yet it is easy to foresee, because facts justify the apprehension, that inclosing and engrossing, to the degree in which they have lately prevailed, will annihilate the small occupiers of land, and reduce the inhabitants of the kingdom to two classes, *viz.* gentry and beggars, or grandees and slaves. See this subject more amply discussed, and the arguments for and against inclosures and large farms, stated under FARM, and INCLOSING of Land.

As in former times the number of the occupiers of land was greater, and all had more opportunities of working for themselves, it is reasonable to conclude, that the number of people willing to work for others must have been smaller, and the price of day-labour higher. The nominal price of day-labour, says an author who wrote a few years ago, is at present no more than about four times, or at most five times, higher than it was in the year 1514. But the price of corn is seven times, and of flesh-meat and raiment about fifteen times higher; therefore the price of labour has been so far from advancing in proportion to the increase in the expences of living, that it does not appear to bear now half the proportion to these expences that it did formerly. What alteration has taken place since these observations were made, we leave others to determine. See on this subject Price's Observations on Reverfionary Payments, Supplement, p. 383, &c. Appeal to the Public on the Subject of the National Debt, p. 93, &c. See LABOUR, and LABOURERS.

For the different kinds of inclosure, see EARTH-banks, FENCE, HEDGE, and WALL.

LAND, Arable. See ARABLE.

LAND, Bog. See BOG.

LAND, Burning of. See BURN-beating, BURNING, LAND, Burning of, and PARING.

LAND, Cateb. See CATCH-land.

LAND, Chalk. See SOIL.

LANDS, Champion. See CHAMPION.

LAND, Charter. See CHARTER-land.

LAND, Chiefly. See CHIEFLY.

LAND, Clay. See SOIL.

LANDS, Court. See COURT-lands.

LANDS, Fabric. See FABRIC-lands.

LAND, Fardel of. See FARDL.

LAND, Folk. See FOLK-land.

LAND, Fore. See FORE-land.

LAND, Glebe. See GLEBE-land.

LAND, Gravelly. See SOIL.

LAND, Head. See HEAD-land.

LAND in peage, Holding. See PEERAGE.

LAND, In. See IN-land.

LAND, Inclosing of. See LAND, Inclosing of, and INCLOSING of Land.

LAND, Lay. See LAY.

LAND, Leaf of. See LEAF.

LAND, Marsh. See MARSH lands.

LAND, Meadow. See MEADOW.

LANDS, Overflowing of. See Flooding of LAND, IRRIGATION, OVERFLOWING and WATERING of Land.

LAND, Osgang of. See OSGANG.

LAND, Plough. See CARRUAGE.

LAND, Rent of. See RENT.

LAND, Road. See ROAD.

LAND, Sandy. See SOIL.

LAND-Telescope. See TELESCOPE.

LANDS, Tenementary. See TENEMENTARY.

LANDS, Thane. See THANES-lands.

LAND, Up. See UP-land.

LAND, Waste. See WASTE.

LAND, Watering of. See WATERING of Land, IRRIGATION, &c.

LANDS, Wood. See WOOD-lands.

LAND, Yard. See YARD-land.

LAND, Yoak. See YOAK of Land.

LAND, Laying the, in Sea Language, denotes that motion of a ship which increases its distance from the coast, so as to make it appear lower and smaller, a circumstance arising from the intermediate convexity of the sea. This is used in contradistinction to *raising the land*, which is produced by the opposite motion of approach towards it. When a ship is got out of sight of land, they say the land is laid.

LAND, To make the. See MAKE.

LAND-Mark, at Sea, is any mountain, rock, steeple, wind-mill, tree, or the like, near the sea-side, which serve to direct ships passing by how to steer, so as to avoid certain dangers, be they rocks, shoals, whirlpools, &c.

LAND, Setting the, is observing by the compass how it bears.

LAND, Shut in. When another point of land hinders the sight of that which a ship came from, then they say the land is shut in.

LAND-To. When a ship lies so far from the shore, that she can but just ken land, then she is said to lie land-to.

LAND-Turn, is a wind that blows from the shore in the night, at certain times, in most hot countries.

LAND, Head, or Point of land, in the Sea Language, is that which lies farther out into the sea than the rest. See POINT, CAPE, &c.

LANDA, in Geography, a kingdom of Borneo, ceded, in 1778, to the Dutch company, together with Succadana,

dana, by the king of Bantam, to whose crown they were appendages.

**LANDAFF.** See **LLANDAFF.**

**LANDAFF**, a township of America, in Grafton county, New Hampshire; incorporated in 1774, and containing 461 inhabitants.

**LANDAU**, a town of France, in the department of the Lower Rhine, and chief place of a canton, in the district of Willimbouurg, situated on the river Queich, which runs into the Rhine; containing four churches; formerly imperial. The place contains 5123, and the canton 15,246 inhabitants, on a territory of 487½ kilometres, in 18 communes. N. lat. 49° 13'. E. long. 8° 10'.—Also, a town of the county of Waldeck; 12 miles N. of Waldeck.—Also, a town of Bavaria, on the Iser; 32 miles W. of Passau. N. lat. 48° 36'. E. long. 12° 37'.

**LAND-CHEAP**, an ancient customary fine, paid either in cattle or money, upon the alienating or selling of land in certain manors, or within the liberty of certain boroughs.

At Malden in Essex, a payment is still made of 13*d.* in every mark of the purchase-money for lands and houses fold in that town; which is called land-cheap.

**LANDE**, in *Geography*, a town of Norway; 36 miles N. of Christiania.

**LANDECK**, a town of the duchy of Warfaw; 48 miles N. of Gnesna.—Also, a town of the county of Tyrol, on the Inn; 39 miles W.S.W. of Inspruck.—Also, a town of Prussian Pomerelia; 64 miles S.W. of Dantzic.—Also, a town of Silesia, in the county of Glatz, on the Biela; 8 miles S.E. of Glatz. N. lat. 50° 15'. E. long. 16° 40'.

**LANDED INTEREST**, a term opposed to monied interest, in political considerations; though there is a near connection between them: for the landed interest is affected by foreign trade. See **MONIED INTEREST.**

The foreign trade of every country must decline, that, 1. Lays unequal taxes in general on its people. 2. That cramps its commerce, the fountain of riches, by high duties, and impolitic prohibitions. 3. That suffers many monopolies. 4. That oppresses its people by prohibiting the importation of victuals, under the pretence of raising the value of its lands. 5. That encourages idleness, by bad laws relating to its poor. 6. That tempts foreigners to carry away its coin for less than its intrinsic value. 7. That makes the obtaining justice chargeable. 8. That suffers a heavy national debt, contracted in time of war, to continue unpaid in time of peace.

The reason why the decline of foreign trade sinks the value of land is, 1. Because it sinks the markets at home. For, the produce of land being rendered excessively dear from the causes above enumerated, foreigners will not take its superfluities; and labour being by the same causes rendered excessively dear, we cannot manufacture or improve that produce, because nations which can afford cheaper supply the markets abroad; so that the produce of the lands, not being carried off as usual, must become a dead stock on the farmer's hands, and cause great quantities to be crowded into markets, where, being encouragement but for few buyers, the price naturally falls; as, for instance, the declining demand of our woollen goods abroad falls the price of wool at home.

2. Because it increases the number of poor, to burden the land.

3. Because it diminishes the number of people: for, as employment lessens, the most indolent, rather than starve here, will fly to other countries, where trade can maintain

them. So the consumption of these being taken away, the demand at market must grow less, and of course rents must fall, yet the farmer's charges must grow greater; for the fewer the hands, the higher wages are: this must break him in the end, and produce all the consequences following that misfortune. Besides, men who trade bring in money; therefore the fewer they are, the less money will be brought; and the less money, the less rent can be given for land.

4. Because the decline of trade diminishes *our riches*. This is a consequence of the above remarks; for having fewer goods capable of being exported by reason of their dear price, and our manufactures declining, must in time be lost: therefore the importation of foreign goods must naturally increase, and more money go out to pay for them.

Nations that have no mines of gold and silver, have no means to get them but by foreign trade; and according to the quantity of these metals they possess, the price of their commodities, and therewith the value of their lands, rise and fall in proportion, which shall now be proved.

According to Dr. Davenant, the whole rental of England, in 1600, did not exceed six millions *per annum*, and the price of land was twelve years purchase; in 1688, the rental was fourteen millions, and the price of land was eighteen years purchase: so that, within this period, the landed interest rose from seventy-two to two hundred and fifty-two millions, and this advance was owing to an increase of trade.

The Britannia Linguens, page 12, says, if there were but five hundred pounds in England, an ox could hardly be worth a penny; therefore the rent must bear its proportion to the riches. This appears by Maitland's History of London; for he says that, in the year 661, land sold at one shilling *per acre*. The reason that land then bore so low a price, was the low price the produce sold at; for he says, that, in the year 1000, an ox sold for 2*s.* 6*d.*, a cow for 2*s.*, a sheep for 1*s.*, and a swine for 8*d.* In 1445, wheat was at 4*s.* 6*d.* *per quarter*; in 1447, at 8*s.*; in 1448, at 6*s.* 8*d.*; in 1449, at 5*s.* A bullock, in 1445, was 5*s.*; a sheep 2*s.* 5*d.*; a hog 1*s.* 11½*d.*; clothing for a year, at the same period, of a common servant of husbandry, 3*s.* 4*d.*; of a chief carter and shepherd, 4*s.*; of a bailiff of husbandry, 5*s.* In 1512, the mean price of wheat in Yorkshire was 6*s.* 2*d.*; the price of malt was 4*s.*, and of oats 2*s.*; so that the nominal price of grain at this time was about a seventh of its nominal price for the last twenty years; reckoning from the time when the author below cited wrote. The price of a fat ox, at the same time and in the same county, was 13*s.* 4*d.*; of a lean ox, 8*s.*; of a wether, 1*s.* 5*d.*; of a calf, 1*s.* 8*d.*; of a hog, 2*s.*; so that the nominal price of meat was no more than about a fifteenth of its present price, and bore the same proportion to the price of corn that it would now bear, were it at half its present price. In an act of parliament of the 25th of Henry VIII. beef, veal, pork, and mutton, are mentioned as the food of the poor, and their price limited to about a halfpenny a pound. Beef and pork in particular were sold in London at 2½ lb. and 3 lb. for a penny; at the same time that wheat was at 7*s.* and 8*s.* a quarter, and bore the same proportion to the price of flesh as it would bear now, were it about 4*s.* a quarter. In 1549, wheat was in London 12*s.* *per quarter*, malt 10*s.*, barley 9*s.*, rye 6*s.* 6*d.*, oats 4*s.*, a middling ox 1*s.* 18*s.*, a wether 3*s.*, butter ¾*d.* and a penny a pound, and cheese a halfpenny a pound. See the citations in the Supplement to Price's Obl. on Reversionary Payments, &c. p. 385, &c. This could be only owing to the little foreign trade the nation had

had at these respective periods, and consequently, to the little quantity of gold and silver which trade had then brought in.

But if it should be asked, What is the reason that, at present, all things are naturally so much advanced in price, to what they were in those days? the answer is, that the quantities of gold and silver brought to Europe since the progress made by the Spaniards and Portuguese in America, have made those metals more common, and of less value than formerly; so that *20s.* will hardly purchase what *1s.* would before the discovery of the West Indies. On this subject, see the article *INTEREST*. To which may be added, the great increase of our national debt and taxes, together with the circulation of the interest of the principal money of the public funds; and likewise that great circulation of paper credit in trade occasioned by notes and bills, which, by promoting an artificial circulation of property, raise the price of commodities, and give the appearance of wealth to the nation; though they are really the characteristics of a declining state. *Post. Dict. Com.*

The dearth of commodities and the cheapness of money are the same things.

**LANDEGODE**, in *Geography*, a small island in the North sea, near the coast of Norway. N. lat.  $67^{\circ} 25'$ .

**LANDEN**, JOHN, in *Biography*, a celebrated mathematician, was born at Peakirk, near Peterborough, in Northamptonshire, in January 1719. He became an early proficient in mathematical science, was a contributor to the *Ladies Diary* in the year 1744, and was one of the most ardent friends to that very useful publication. He contributed to this annual work till within a few years of his death. The life of Mr. Landen was far from an eventful one. He passed the earlier part of his life, as a farmer, at Walton, near Peterborough, at the same time he gave mathematical instructions to several young persons in the neighbourhood. From Walton, Mr. Landen, in 1762, removed to Milton, the seat of earl Fitzwilliam, to undertake the business of land steward to his lordship; and in this situation he remained till within a year or two of his death. To return to the mathematical labours of our author.—He published, in the *Philosophical Transactions* for the year 1754, “An Investigation of some Theorems, which suggest several very remarkable Properties of the Circle, &c.” and in the following year he published a volume, intitled “*Mathematical Lacubrations.*” This title was intended to inform his friends and the public, that the study of mathematics was at that time rather the pursuit of his leisure hours, than his principal employment. They contain a variety of tracts relating to the rectification of curve lines, the summation of series, the finding of fluents, and many other points in the higher parts of mathematics. From this time to the year 1766 he gave the world several valuable works; and on the 16th of January of this year, he was elected a fellow of the Royal Society: soon after which he inserted in the *Philosophical Transactions*, “A Specimen of a new Method of comparing curvilinear Areas;” by means of which, many areas are compared, that did not appear to admit of comparison by any other method; a circumstance of considerable importance in that part of natural philosophy which relates to the doctrine of motion. These are but a small part of the works which he produced, and which have given celebrity to his name. In the years 1781, 1782, 1783, he published three small tracts “On the Summation of converging Series,” in which he explained and shewed the extent of some theorems which had been given for that purpose by De Moivre, Sterling, and Thomas Simpson, in

answer to what he conceived to have been written in disparagement of those excellent mathematicians. Mr. Landen was author of a work published in two volumes, and at different times, intitled “*Memoirs.*” The second volume contains his last labours on the solution of the general problem concerning rotatory motion. It comprises also a resolution of the problem relating to the motion of a top; with an investigation of the motion of the equinoxes, in which Mr. Landen has, first of any one, pointed out the cause of sir Isaac Newton’s mistake in his solution of this celebrated problem. He lived to see the volume completed, and received a copy of it the day before his death, which happened January 15, 1799, at Milton, in the 71th year of his age. Mr. Landen was not only distinguished by his eminent talents as a mathematician, but by the excellence of his moral character. His temper, however, was not a good one; and he was too apt to look with contempt on those whom he deemed his inferiors. His MSS. were sold for waste paper; a circumstance that did not reflect much credit on those persons who came in possession of them.

**LANDEN**, in *Geography*, a town of France, in the department of the Ourte, and chief place of a canton, in the district of Huy, seated on the river Becke; 17 miles W.S.W. of Liege. The place contains 642, and the canton 9265 inhabitants, on a territory of  $82\frac{1}{2}$  kilometres, in 25 communes.

**LANDERNEAU**, a town of France, in the department of Finistere, and chief place of a canton, in the district of Brest. The place contains 3577, and the canton 13,804 inhabitants, on a territory of 180 kilometres, in 9 communes. N. lat.  $48^{\circ} 27'$ . W. long.  $4^{\circ} 10'$ .

**LANDERON**, a town of Switzerland, in the principality of Neuchatel, situated at the S.W. extremity of the lake of Bienne, and inhabited by Roman Catholics; 7 miles N.E. of Neuchatel.

**LANDES**, LES, a department of the S.W. region of France, formed of Landes and Chalosse, districts of Gascony, in N. lat.  $44^{\circ}$ , a maritime territory between Lower Pyrenées and Gironde; bounded on the N. by the department of the Gironde, on the E. by that of Lot and Garonne, and Gers, on the S. by the Lower Pyrenées, and on the W. by the sea, containing 468 square leagues, and 228,899 inhabitants, and divided into three circles or districts, *viz.* Mont-de-Marian, which has 72,968 inhabitants, St. Sever, including 78,125, and Dax, with 77,796 inhabitants, 28 cantons, and 368 communes. Its contributions amount to 145,376 fr. and its expenses charged on the departments are 203,769 fr. 02 cents. The soil of this department is for the most part sandy and unfruitful, the N. and W. parts consisting of heath and marshes, and poorly cultivated. Some parts, however, towards the S.E. are more fertile; and this department yields some grain, fruits, and excellent pastures. It has also forests of pines, quarries, and mineral springs. Its chief town is Mont-de-Marian.

**LANDESHUT**, a town of Silesia, in the principality of Schweidnitz, on the Bober. The town was founded in 1292, and it has a Latin school, a Roman Catholic church, and by permission and purchase a Lutheran church. Its linen trade is flourishing; 18 miles W.S.W. of Schweidnitz. N. lat.  $50^{\circ} 30'$ . E. long.  $15^{\circ} 55'$ .

**LAND-FALL**, is a sea-term, signifying to fall in with the land, or the first land discovered after a sea-voyage.

**LAND-FALL**, *Good*, is when a ship makes or sees the land, as she expected, according to her reckoning. The contrary is called a *bad land-fall*.

**LAND-GABLE**, an ancient term for a tax or rent, issuing

iffuing out of land; answering to what we now call *ground-rent*.

**LANDGRAVE**, formed of the German *land, earth, and grass, or grave, judge, or count*, a name formerly given to those who executed justice on behalf of the emperors, with regard to the internal policy of the country. The title does not seem to have been used before the eleventh century. These judges were first appointed within a certain district of Germany; a process of time the title became hereditary, and these judges assumed the sovereignty of the several districts or countries over which they presided. Landgrave is now applied, by way of eminence, to those sovereign princes of the empire who possess by inheritance certain estates, called *landgraviates*; and of which they receive the investiture of the emperor. There are four princes who have this title, *viz.* those of Thuringia, Hesse, Alsace, and Leuchtenberg. There are also other landgraves who are not princes, but counts of the empire. See **COUNT**.

**LANDGUARD FORT**, in *Geography*, an English fort, situated on a point of land at the S.E. extremity of the county of Suffolk, at the mouth of the rivers Orwell and Stour, opposite to Harwich; furnished with a garrison, under the command of a governor, and a platform of guns to defend the coast.

**LANDGUARD**, a point on lake Erie, in Upper Canada; formerly called *Point aux Pins*, situated in N. lat.  $42^{\circ} 7' 15''$ . To this place there is a great resort of Indians in the spring, on account of the abundance of fish and fowl, which may be then taken. This point is about twenty miles E. of the South Foreland, and bears the only pine-timber on this coast.

**LANDI, ORTENSIO**, in *Biography*, was born at Milan about the middle of the sixteenth century: he was educated at his native place, and at Bologna. Being in necessitous circumstances, he attempted to gain a maintenance by the practice of physic, which he exchanged, in a very short time, for theology, and entered into the order of St. Augustine. It has been said by some writers that he apostatized from the church, but others say that in this particular he has been mistaken for a different person. While at Milan, he published two dialogues, entitled "Cicero relegatus," and "Cicero revocatus," which he feigns to have been held by a company of learned men in 1533. His next work was entitled "Forcianæ Quaestiones," in which, under the feigned name of Philalethes, he treats, in an entertaining manner, on the customs, dress, diversions, and inhabitants of the different cities of Italy. It was published at Naples in 1536. He now travelled into France, and contracted a close friendship with Stephen Dolet, who was afterwards burnt as an atheist. Upon his return to Italy, he entered successively into the service of the bishops of Trent and Catauia. In 1540, he published a dialogue against Erasmus, who had been dead four years, and on account of which he was severely handled by an able antagonist. While he was at the court of Francis I. in 1543, he published his two books of "Paradoxes;" these he soon found had been written with too great freedom, and as they began to excite considerable attention, he thought proper to answer them himself anonymously, and in his reply he is said to have treated himself with as little ceremony as any real opponent would have done. In 1544, he travelled through Germany, and afterwards through the different provinces of Italy, which he described in a work entitled "Commentario delli più notabili et mostuose cose d'Italia et altri luoghi." He is supposed to have died soon after the year 1560, leaving behind him many other works besides those which have been enumerated. He lived in friendship with several of the learned

men of that age, by whom he has been much praised. Gen. Biog.

**LANDINGS**, in *Architecture*, the first part of the floor at the head of a pair of stairs.

**LANDINO, CHRISTOPHER**, in *Biography*, an Italian scholar, was born at Florence in 1434. He studied first at Volterra, under Angiola da Todi, by whom he was so much beloved, that he not only maintained him a long time at his own expence, but at his death bound his heirs to support him three years longer. He was intended by his father for the law, and was by him obliged to pursue it till he obtained the liberal patronage of Cosimo and Peter de Medici, by which he was enabled to return to his favourite pursuits, and indulge himself in the study of the Platonic philosophy. He became one of the chief ornaments of the Platonic academy at Florence, and lived in strict friendship with Poliziano, Ficino, and others of its members. In 1457, he gave public lectures in polite literature at Florence, which contributed to the progress of learning in that period. At an advanced age he obtained an office in the state, and was presented with a palace for his residence. He died in 1504, at Prato Vecchio. His "Latin Poems" will bear a comparison with the most able compositions of that age. He wrote commentaries on Virgil and Horace, and Dante, which went through several editions. He translated Pliny's "Natural History" into Italian, and was author of "Dialogues on the Nobility of the Mind," and other pieces connected with moral philosophy. He composed some Latin and Italian orations, which were printed.

**LANDIVISIAN**, in *Geography*, a town of France, in the department of Finisterre, and chief place of a canton, in the district of Morlaix; 10 miles W.S.W. of Morlaix. The place contains 2124, and the canton 11,460, on a territory of 150 kilometres, in 7 communes.

**LANDIVY**, a town of France, in the department of the Mayenne, and chief place of a canton, in the district of Mayenne; 18 miles N.W. of Mayenne. The place contains 1872, and the canton 11,223 inhabitants, on a territory of 187½ kilometres, in 8 communes.

**LAND-LOCKED**: a ship is said to ride *land-locked*, when she is surrounded with land, that is, is at anchor in a place where there is no point open to the sea, so that she is safe from the violence of winds and tides.

**LANDO**, pope, in *Biography, a Sabine by birth, succeeded to the pontifical throne on the death of Anastasius III. in the year 913. He was indebted for his elevation to Theodora, and her daughters Marozia and Theodora, all of them no less famous for their beauty, their wit, and address, than infamous for the scandalous lives which they led. Lando died within about six months of the time that he was elevated to the papal see, and during that short reign he did nothing worthy of note, or that need be recorded in this work. Moreri. Bower.*

**LANDRECIES**, in *Geography, a town of France, in the department of the North, and chief place of a canton, in the district of Avesnes, seated on the Sambre. It was taken from the Spaniards by the French in 1655, and continued in their possession by the peace of the Pyrenees, when they enlarged its fortifications, and made it one of the strongest places in the country. It has only two gates, one towards the east, called the "Gate of France," and the other towards the west, called the "Gate of Quefnay." It suffered severely by the siege of 1794, and surrendered to the allies; but in the same year the garrison, consisting of 20,000 men, surrendered to the French. The place contains 2867, and the canton 8865 inhabitants, on a territory of 90 kilometres, in 9 communes. N. lat.  $50^{\circ} 7'$ . E. long.  $3^{\circ} 45'$ .*

LANDRIANO, a town of Italy; 11 miles S.S.E. of Milan.

LANDROAL, a town of Portugal, in Alentejo; 13 miles N. of Mourao. N. lat.  $38^{\circ} 35'$ . E. long.  $7^{\circ} 12'$ .

LANDSBERG, a town of Prussia, in the province of Natangen; 26 miles S. of Königsberg. N. lat.  $54^{\circ} 14'$ . E. long.  $20^{\circ} 30'$ .—Alfo, a town of the duchy of Stiria; 24 miles S.W. of Gratz.—Alfo, a town of Germany, in the county of Hoya, on the Wefer; 6 miles S.S.W. of Nieuburg.—Alfo, a town of Silefia, otherwise called *Gorzovo*, in the circle of Oppeln, on the borders of Poland; 30 miles N.E. of Oppeln. N. lat.  $51^{\circ} 3'$ . E. long.  $18^{\circ} 20'$ .—Alfo, a town of Bavaria, on the Lech; 18 miles S. of Augsburg. N. lat.  $48^{\circ}$ . E. long.  $10^{\circ} 51'$ .—Alfo, a town of Saxony, in the circle of Leipzig; 14 miles N.W. of Leipzig. N. lat.  $51^{\circ} 34'$ . E. long.  $12^{\circ} 11'$ .—Alfo, a town of Brandenburg, in the New Mark, on the Warta; containing three churches, a royal magazine, and feveral manufactures of fluff and cloth, with a confiderable trade in wool; 20 miles E.N.E. of Cuftrin. N. lat.  $52^{\circ} 48'$ . E. long.  $15^{\circ} 20'$ .—Alfo, a town of Brandenburg, in the Middle Mark; 14 miles E.N.E. of Berlin. N. lat.  $52^{\circ} 35'$ . E. long.  $13^{\circ} 48'$ .

LANDSCAPE, or LANDSHIP, the view or profpect of a country, extended as far as the eye will reach.

LANDSCAPE *Painting*, is that peculiar application of the art of painting, which represents extended views of whatever is attached to the furface of the earth; as mountains, rocks, woods, buildings, &c. It is even applied to views of the fea, particularly when any portion of the land is feen; and, in the general divifion of the practice of the art into four principal branches, landscape-painting includes all representations of the fea alone; although, in common difcourfe, they are generally termed according to their character: as a calm at fea, a ftorm, a fea-light, &c. &c.

The great points which the artift ought to aim at, who practices landscape-painting, are, to mark juft proportion and true perspective; to obtain a free and varying touch, which may fully characterize the various objects he muft of neceffity be called upon to imitate; and to produce the effect of fpace, or what is technically termed diftance.

There are two kinds of proportion which require attention in order to produce a pleafing landscape. One is, between the quantum of the furface of the picture appropriated to the fky, and that allotted to the earth or the figures intended to be introduced, be they mountains, houfes, rocks, or trees: and the other is that of the various parts of the picture, reciprocally, according to their various diftances in the fcene. Of the latter, after the fize of the objects on the fore-ground is determined, perspective is the fole regulator: therefore a knowledge of the principal rules of that fcience is here abfolutely requifite.

With regard to the former of thefe proportions, the fubject of the picture will undoubtedly furnifh the beft means of deciding juftly. If the fcene be mountainous, viewed from below, and at a fhort diftance, the fpace allotted to the fky muft be fmall and near the top of the picture. If, on the contrary, the view be of an open champaign country, the reverse will be the juft characteristic of the picture; and the fky will occupy by far the larger part. It is by no means afferted that this will always be the cafe, as for inftance, if the view of a plain be taken from a great height, then of courfe the horizon will rife very high; but this would have more the character of a plan, than a picturefque or natural view. Common fenfe points out the rule in the two fupposed cafes; but it is not eafy to regulate this matter in ordinary compositions, whereas, to make the work captivating, it is of much more importance than is generally imagined,

and a large demand is made upon tafte to regulate it. In general, much more grandeur is acquired by a low horizon, and an ample fpace of fky, than by any other proportion; and next in effect to that, is the direct reverse. In both, it is the quantity doublets that produces the impreffion; and this principle holds good, not only in landscape, but in all other fubjects on which the art is employed. In fact, the general principles of the art of painting are alike applicable in all its different branches. The fame felection in ftyle of defign, or rather choice of nature; the fame aims in compofition; the fame contrals in arrangements of colour, except that they can never, or very rarely, be fo powerful in landscape, as where the picture represents animated or artificial objects. In landscape not only are the objects fit to be introduced, of a clafs which are not fraught with ftrong colours, particularly of red or blue, but being furrounded by open air, and receiving reflections of light and colour in every direction, their natural vividnefs is diminiſhed; and as they recede from the eye, the density of the atmosphere intervening between them and the fpectator, envelopes them in a mift, and renders them indiftinct in various degrees; till in the extreme diftance it reduces all colours to one hue of a light greyifh blue, almoft intermingling them with the fky.

It is by the intervention of this grey hue in the atmosphere, which arifes from reflections of light thrown off by particles floating in the vapours which hover upon the furface of the earth, (aided by diminution of form,) that the effect of diftance is produced; and to imitate this with truth, and in a tone correfpondent to the kind of day or feafon which is felected for representation, is one of the principal difficulties of landscape painting.

It is vain to attempt to give rules for overcoming this difficulty. Different matters have proceeded by different ways to gain poffeffion of this desideratum. Claude in one ftyle, and Wilfon in another, have both admirably effected it. One by feumbling a grey, or air-tint, over the diftant parts; the other by working the tint in the body of colours. Obfervation of their pictures, with tafte cultivated by a long continued obfervance of nature, is the only means of acquiring a juft feeling of the fimplicity and purity exhibited in her works, and the confequent power of representing them in all the varied effects the exhibits; either in her more gay, or fombrous moments; when the face of the earth is illumined with funfhine, and fparkling with luftre; or when clouds bedim and envelope its beauties in fhade, and the forms of diftant objects are loft in the whirlwind and the ftorm.

Though landscape-painting has not the fame powerful means to work with as hiftoric painting, which enjoys the great advantage of animation and expreffion in its fubjects, and likewise presents the greateft difficulty to overcome; yet no true and enthuſiaſtic lover and obferver of nature, can avoid acknowledging, that it poffeffes the power of exciting great intereft in the mind. A ftorm represented by the pencil of Gaspar Pouſſin, or a calm by that of Claude, will not fail to impreſs the obferver with ideas of terror, or gentleneſs. The one, who skillfully traced the paths of the wind in its ravages, and the deformity produced by the falling ſhower; and the other, who loved to dwell upon the beauties of the earth, in moments of undifturbed tranquillity, equally intereft our feelings, and excite thoſe emotions which fuch varied circumſtances in nature are calculated to infpire. Compared with fuch views of the higher objects and airs of art, the practitioner in landscape-portrait painting, or one who paints views of particular ſpots, ſinks into about the fame ratio, as the portrait painter of mankind holds to him who engages his talents in the representations of hiftory. Yet ſtill his talk is not devoid either of pleaſure or intereft.

The same principles are required for practice, but they are unfortunately often obliged to yield to peculiarities which destroy their simplicity and prevent their effect; unless the artist has obtained that extraordinary talent of introducing casual circumstances, such as ideal shadows, accidental reflections, and agreeable figures, in such a manner as to unite or improve imperfect forms, and guide or attract the eye from disagreeable parts. As is the aim of the improver of grounds, or, as he is now termed, the landscape gardener, such ought to be that of the landscape painter. Whenever blemishes in form occur, they should be hidden, and where natural beauties are bestowed, they should be exhibited to view; and adorned with proper adjuncts of trees, water, clouds, or figures. A person not conversant with the powers of combination and contrast in design, can have no conception of their extraordinary power to heighten the effect of the dulcist scenes, and the meanest objects. It should therefore be the principal task of the artist to observe those which are constantly occurring among natural objects, their effects, and the different sentiments they excite; so that he may possess a store to recur to, in time of need.

The beauty of landscape-painting depends very much upon simplicity of selection, and clearness and freshness of colour. The former should not only govern the choice of objects or scenery, but also the manner of representing them, *i. e.* the artist must not attempt to delineate all the forms he sees in a tree or a rock; that would not only be an almost endless labour, but an imperfect one, even when the greatest skill was exhibited; his duty is rather to select those forms which more immediately characterize the object, and mark them only; taking care to avoid heaviness.

Of this kind was the practice of Titian, Claude, Domenichino, Poussin, Mola, and all the best landscape-painters of the Italian school, and Rubens and Rembrandt adopted it; whilst Hobbema, Ruysdael, Both, Wynants, and almost all the Flemish school, by attempting too minute an imitation in smaller matters, lost dignity and even interest.

Among those who have profited with success this delightful branch of the art of painting, the name of Claude Gellee, usually known by that of Claude de Lorraine, deservedly stands pre-eminent. He may have been surpassed by Titian in wild and romantic scenery, and grandeur of style in design, but neither he nor any other has ever equalled Claude's truth and purity of colour and effect. Hitherto the perfection with which he has represented the effect of the atmosphere is unrivalled. Even Cuypp and our own Wilson, who have arrived the nearest to him, still lack his completion of effect. Their art is more apparent than his in his best works; and great chastity and sweetness of taste appear generally to have governed his choice of scene and of parts. Nicolo Poussin has left a great number of highly interesting landscapes, in a style peculiarly his own. He appears to have delighted in the hues of the earth and trees after wet, and without sun; and in the tones of twilight; which admirably coincides with his choice of scenery and the classic objects he introduced into it. His nephew Gaspar proceeded in another track, and made pictures from the scenes which the Apennine mountains afforded him; which, while they are wrought with great freedom, still bear too much the air of portraiture, and too often lack atmosphere. The same may be said in a greater degree of the works of Salvator Rosa, who delighted to represent the most wild and desert scenes of nature; which he executed with a touch in perfect consonance with their character. It was with Wilson, as we have above mentioned, that the taste and talent of Claude for producing the air-tint, (as that which produces the effect of

the atmosphere is technically termed,) was most powerfully revived: and of him it may truly be said, that had his patience in completing his pictures been equal to his taste in colour, composition, and effect, the ancient master might have fallen under the modern one; and we should have had to boast, that the greatest painter of landscapes the world ever produced, was an Englishman.

**LANDSCRON**, a town of Bohemia, in the circle of Chrudim; 27 miles E. of Chrudim. N. lat. 49° 50'. E. long. 16° 23'.

**LANDSCRON**, a town of Prussia, in Natangen; 18 miles N.E. of Heilperg.

**LANDSCRONA**, a fortified sea-port town of Sweden, on the W. coast of the province of Skoue, on an island near the Sound: a staple town, with a good harbour. The harbour lies between the continent and a small island, and is 20 feet deep; 12 miles S. of Helsingborg. N. lat. 55° 52'. E. long. 12° 36'.

**LANDSELE**, a small island in the East Indian sea, near the N. coast of the great Andaman. N. lat. 13° 38'. E. long. 93° 7'.

**LAND'S-END**. See **CORNWALL**.

**LAND'S-END**, a cape on the N. coast of the island of Sheppey; 4 miles N. of Sheerness.

**LANDSER**, a town of France, in the department of the Upper Rhine, and chief place of a canton, in the district of Altkirch. The place contains 651, and the canton 106,629 inhabitants, on a territory of 150 kilometres, in 22 communes.

**LANDSHAAG**, a town of Austria, on the Danube; 19 miles S.W. of Freustadt.

**LAND'S-HEIGHT**, or the high ground, in North America, that which lies on the chain of lakes between lake La Pluie and lake Superior, where is a portage of 7 miles; 80 miles E. of the great portage from the W. end of lake Superior.

**LANDSHUT**, or **LANDSUT**, a town of Moravia, in the circle of Brunn; 16 miles S.E. of Aufpitz.

**LANDSUT**, a town of Bavaria, on the river Isar; an open well-built town, and the capital of a government; containing two palaces and a college with a church in it, the steeple of which is reckoned the highest in Germany; 52 miles N.E. of Munich. N. lat. 48° 29'. E. long. 12° 51'. Also, a town of Austrian Poland, in Galicia; 72 miles W. of Lemberg.

**LANDSKIP**. See **LANDSCAPE**.

**LANDSORT**, in *Geography*, a small island in the Baltic, near the coast of Sweden. N. lat. 58° 52'. E. long. 17° 10'.

**LANDSTHUL**, a town of France, in the department of Mont Tonnerre, and chief place of a canton, in the district of Deux Ponts. The place contains 705, and the canton 7910 inhabitants, in 32 communes.

**LANDSTRASS**, or **LANDTREST**, a town of Carniola, situated on an island in the river Gurek, with a cathedral; 18 miles S. of Celley.

**LAND-TAX**, is one of the usual annual taxes, which has superseded all the former methods of rating either property, or persons in respect of their property, whether by tenths, fifteenths, subsidies on land, hidage or hidage, scutage or escuage, or talliage. Tenths and fifteenths were temporary aids issuing out of personal property, and granted to the king by parliament, being the real tenth or fifteenth part of all the moveables belonging to the subject. We meet with the payment of fifteenths as far back as the statute of Magna Charta; in the conclusion of which, the parliament grants to the king, for the concessions made by him, a fifth part

of all their moveable goods. This taxation was originally charged upon the several individuals, but in the eighth year of Edward III. a certain sum was rated in every town, &c. In process of time this fifteenth being insufficient for the public exigence, the number of fifteenths was augmented to two or three fifteenths. Whenever, in later years, the commons granted the king a fifteenth, every parish in England knew their proportion of it; *i. e.* the same identical sum that was assessed by the same aid in the eighth of Edward III. and then raised it by a rate among themselves, and returned it to the royal exchequer. (See FIFTEENTH. See also TENTH.) The other ancient levies were in the nature of a modern land-tax; for we may trace the original of that charge as high as to the introduction of our military tenures; when every tenant of a knight's fee was bound, if called upon, to attend the king in his army for forty days in every year. In lieu of this personal attendance, a pecuniary satisfaction came to be levied by assessments, at so much for every knight's fee, under the name of feutages. (See ESCutage.) Of the same nature with these were the assessments of hydage or hidage upon all other lands, and of tallage upon cities and boroughs. But they all gradually fell into disuse, upon the introduction of subsidies, about the time of king Richard II. and king Henry IV. (See SUBSIDY.) In lieu of subsidies, which were usually raised by commissioners appointed by the crown, or the great officers of state, the parliament, in the beginning of the civil wars, introduced the practice of laying weekly and monthly assessments of a specific sum upon the several counties of the kingdom, to be levied by a pound rate on lands and personal estates; which were occasionally continued during the whole usurpation, sometimes at the rate of 120,000*l.* a month, sometimes at inferior rates. After the restoration the ancient method of granting subsidies, instead of these monthly assessments, was twice, and twice only renewed, *viz.* in 1663, when four subsidies were granted by the laity and four by the clergy; and in 1670, when 800,000*l.* was raised by way of subsidy, which was the last time of raising supplies in this manner. The monthly assessments being established by custom, raised by commissioners named by parliament, and producing a more certain revenue, subsidies were discontinued, and occasional assessments granted as emergencies required. These periodical assessments, the subsidies which preceded them, and the more ancient feutage, hydage, and tallage, says judge Blackstone, were to all intents and purposes a land-tax; and the assessments were sometimes expressly called so. However, in the year 1692, a new assessment or valuation of estates was made throughout the kingdom, which, though by no means a perfect one, had this effect, that a supply of 500,000*l.* was equal to 1*s.* in the pound of the value of the estates given in. And, according to this enhanced valuation, from the year 1693 to the present, the land-tax has continued an annual charge upon the subject; above half the time at 4*s.* in the pound, sometimes at 3*s.*, sometimes at 2*s.*, twice, *viz.* in 1732 and 1733, at 1*s.* but without any total intermission. The medium has been 3*s.* 3*d.* in the pound, being equivalent to twenty-three ancient subsidies, and amounting annually to more than a million and a half of money. The method of raising it is by charging a particular sum upon each county, according to the valuation of 1692; and this sum is assessed and raised upon the personal as well as the real estates of individuals by commissioners appointed in the act, being the principal landholders of the county, and their officers.

It is observed by Dr. Smith, in his "Nature and Causes of the Wealth of Nations," (vol. iii.) that a land-tax, like that of Great Britain, assessed upon each district according

to a certain invariable canon, though it should be equal a its first establishment, necessarily becomes unequal in process of time, according to the unequal degrees of improvement, or neglect in the cultivation of the different parts of the country. In England, the valuation according to which the different counties and parishes were assessed to the land-tax by the 4th of William and Mary, was very unequal even at first establishment. This tax, therefore, offends against the first of those four maxims which this ingenious writer proposes, with regard to taxes in general. (See Tax.) This maxim is, that the subjects of every state ought to contribute towards the support of the government, as nearly as possible, in proportion to their respective abilities; that is, in proportion to the revenue which they respectively enjoy under the protection of the state. However, it is perfectly agreeable to the other three. It is perfectly certain, and not arbitrary. The time of payment for the tax, being the same as that for the rent, is as convenient as it can be to the contributor. Although the landlord is in all cases the real contributor, the tax is commonly advanced by the tenant, to whom the landlord is obliged to allow it in the payment of the rent. Moreover, this tax is levied by a much smaller number of officers than any other which affords nearly the same revenue. As the tax upon each district does not rise with the rise of the rent, the sovereign does not share in the profits of the landlord's improvements. It does not therefore obstruct the industry of the people; nor subject the landlord to any other inconvenience besides the unavoidable one of paying the tax. The advantage, however, which the landlord has derived from the invariable constancy of the valuation by which all the lands of Great Britain are rated to the land-tax, has been principally owing to some circumstances altogether extraneous to the nature of the tax. It has been owing in part to the great prosperity of almost every part of the country: the rents of almost all the estates of Great Britain, having, since the time when this valuation was first established, been continually rising, and scarcely any of them having fallen. The landlords, therefore, have almost all gained the difference between the tax which they would have paid, according to the present rent of their estates, and that which they actually pay according to the ancient valuation. But if the state of the country had been different, and rents had been gradually falling in consequence of the declension of cultivation, the landlords would almost all have lost this difference. As the tax is made payable in money, so the valuation of land is expressed in money. Since the establishment of this valuation, the value of silver has been pretty uniform, and there has been no alteration in the standard of the coin, either as to weight or fineness. But if silver had risen considerably in its value, the constancy of the valuation might have proved very oppressive to the landlord. In circumstances, somewhat different from those which have actually taken place, this constancy of valuation might have been a great inconvenience, either to the contributors, or to the commonwealth. A tax upon the rent of land which varies with every variation of the rent, or which rises and falls according to the improvement or neglect of cultivation, has been recommended by those philosophers called economists in France, as the most equitable of all taxes. In the Venetian territory, all the arable lands leased to farmers are taxed at a tenth of the rent. The leases are recorded in a public register, kept by the officers of the revenue in each province or district. A proprietor cultivating his own lands is allowed a deduction of one-fifth of the tax, and pays only 8 instead of 10 *per cent.* of the supposed rent. A land-tax of this kind, says Dr. Smith, is certainly more equal than

than the land-tax of England, but it might not, perhaps, be altogether so certain, and the assentment of the tax might frequently occasion more trouble to the landlord, and the levying of it might be more expensive. In the ancient dominions of the king of Prussia, the land-tax is assessed according to an actual survey and valuation, which is reviewed and altered from time to time. According to that valuation, the lay proprietors pay from 20 to 25 per cent. of their revenue. Ecclesiastics from 40 to 45 per cent. In some other countries the same method is pursued. A land-tax assessed according to a general survey and valuation, how equal soever it may be at first, must, in the course of a very moderate period of time, become unequal; and to prevent its becoming so would require the continual and painful attention of government to all the variations in the state and produce of every different farm in the country.

The sum fixed by 38 Geo. III. c. 5. f. 1. to be paid for the land-tax in Great Britain is 2,937,627*l.* 9*s.* 4*d.*, which is now made perpetual. To this time the land-tax acts had been annual; but by 38 Geo. III. c. 60. after reciting, that it may materially conduce to strengthen public credit, that the duty now payable for one year on land should be made perpetual, subject to redemption by purchase on conditions herein set forth; it was enacted, that the several sums charged by virtue of an act (38 Geo. III. c. 5.) granting an aid for the service of the year 1798; on the respective counties, &c. in respect of the manors, messuages, &c. to be raised and paid within one year, from the 25th of March, 1798, shall, after the expiration of the said term (allowing for certain specified exceptions) continue, and be raised and paid after the 25th of March in every year for ever. And all powers and provisions contained in the said act shall be in full force, and be duly executed; subject to the regulations and conditions of redemption or purchase mentioned in it. Provided always, that none of the provisions herein contained shall extend to any sums charged by the said act upon personal estates and perquisites of office; which sums shall, after the 25th of March, 1799, be ascertained, raised, collected, and paid, according to the directions of an act to be passed for that purpose. (39 Geo. III. c. 3.) It is also enacted, that the land-tax not purchased by proprietors shall be sold to other persons, subject to redemption by the person in possession, or having any beneficial or future interest in the lands: provided that in such cases, all such lands whereon the land-tax so purchased shall be charged, shall, until such redemption take place, be subject to a new assessment of the said land-tax from year to year, by an equal rate, according to the value thereof, in common with each other, without any power in such purchaser to exonerate the same from such land-tax, or to fix the rate of land-tax to be charged thereon. Also, where the whole tax in any place shall not be sold, such lands as are not exonerated by this act from such land-tax, shall continue subject to a new assessment yearly, and from year to year, by an equal rate, according to the value thereof, not exceeding in any year 4*s.* in the pound on such annual value. It is also enacted, that in case persons entering into any contract for the redemption or purchase of any land-tax, shall neglect to complete their contract, such contract shall be void, and the tax be revived, and again assessed and collected; and the persons thus making default shall forfeit not exceeding one-fifteenth part of the consideration. Where land-tax, remaining unsold, shall exceed 4*s.* in the pound on the annual value, the same shall be subject to an abatement in the manner directed by the said act. (38 Geo. III. c. 60. f. 103. 42 Geo. III. c. 116. f. 181.) By this last act, the provisions of the several acts for the

redemption of the land-tax are repealed from the 24th of June, 1802, from which date all contracts are to be entered into and made according to that act, and the 43 Geo. III. c. 51. to render the same more effectual. As the land-tax not purchased will remain to be collected as before, it may not be improper or unuseful to detail the following particulars relating to it. By 38 Geo. III. c. 5. the general qualification of commissioners in counties, with some few exceptions, is 100*l.* a-year of landed property: these commissioners, before they can act, are required to take the oaths of allegiance, supremacy, and abjuration, under a penalty of 200*l.* to the king: and by 28 Geo. III. c. 2. f. 40. an oath, if required, specifying in writing the parish, situation, quantity of land, whether freehold or copyhold, of the premises which entitle them to act as commissioners. When they first meet, they direct the return and appointment of proper assessors: and by 20 Geo. III. c. 17. they shall cause to be delivered to each assessor a printed form of assessment, according to which they shall make their assessments. At their second meeting they direct the assessors how to proceed in settling the several rates and charges. By 39 Geo. III. c. 3. the several sums charged upon estates in ready money, debts, goods, wares, merchandizes, chattels, or other personal estate, by the act of 38 Geo. III. c. 5. and which were not authorized to be sold by the said act of 38 Geo. III. c. 60; and also the several sums hereby charged in respect of any public office or employment, or any annuity, pension, stipend, or other annual payment, shall be assessed and paid in the following manner. That is to say, the several sums charged by virtue of the said act on personal estates as aforesaid, shall be, and are hereby set and imposed on the respective parishes, constablewicks, divisions, allotments, and places, wherein the same have been, or shall be so charged by virtue of the said act, and towards raising the several sums hereby charged on the same respectively, all persons, bodies politic and corporate, guilds and fraternities within such places respectively, having any estate in ready money, or in debts owing to them, or having any estate in goods, wares, merchandize, chattels, or other personal estate belonging to, or in trust for them, (except such sums as they may *bona fide* owe, and such debts owing to them as shall be by the commissioners adjudged desperate, and also except stock upon lands, and such goods as are used for household stuff; and also except such loans and debts as are owing from his majesty,) shall be charged with as much equality and indifferance as is possible by a pound rate, *viz.* for every 100*l.* of such ready money and debts, and for every 100*l.* worth of such goods, wares, and merchandize, or other personal estate, and so in proportion for more or less, towards the said respective sums by this act imposed upon every such parish or place charged therewith as aforesaid, so that by the said rates so to be assessed as aforesaid, upon such personal estates as aforesaid, the full sum hereby set upon the same, shall be completely assessed, collected, and paid. f. 2.

And towards raising the sums charged on persons in respect of public offices, or employments of profit, all persons, having, using, or exercising the same, which are assessed by virtue of the said act of 38 Geo. III. c. 5; and all clerks, agents, secondaries, substitutes, and other inferior ministers whatsoever, (such military officers as are mustered by the muster-master general of the army, or in pay of the army or navy in respect of such offices, only excepted,) shall pay any sum not exceeding what such office or employment shall be assessed in the year commencing 25th March, 1798, by virtue of the said act of 38 Geo. III. c. 5. And all persons, guilds, fraternities, bodies politic and corporate, having any annuity,

ansuity, pension, or other yearly payment, either out of the exchequer, or any branch of the revenue, or payable, or secured to be paid by any person whatsoever, (not issuing out of any lands, tenements, or hereditaments, or charged upon the same, nor included in any assessment made thereon by the said act of 38 Geo. III. c. 5. and not being annuities or yearly payments which by any act of parliament shall be exempted from the payment of taxes,) shall pay 4s. for every 20s. by the year for the same, to be levied and collected in like manner, and by the same persons as the land-tax. s. 3, 4.

It is provided that nothing in this act shall extend to the queen or royal family; nor to charge the pensions of superannuated sea-officers or their widows, poor knights of Windsor, or poor clergy of the Isle of Man, or tolls on turnpike roads. By 38 Geo. III. c. 5. the charge upon real estates shall be as follows: That the entire sum may be raised, all manors, messuages, lands, and tenements; all quarries, mines of coal, tin and lead, copper, mundick, iron, and other mines, iron-mills, furnaces, and other iron-works; salt-springs, and salt-works; all alum mines and works; all parks, chafes, warrens, woods, underwoods, coppices; all fishings, tithes, tolls, annuities, and all other yearly profits; and all hereditaments whatsoever—shall be charged with as much equality and indifferance as possible, by a *pound rate*, to make up the several sums charged by the act on each county or place.

A parson who lets to each parishioner his own *tithes* is properly the occupier, and ought to be rated. 16 Viner, 427.

But if a parson makes a lease of his tithes to one person, and that person afterwards lets to each parishioner his own tithes, in that case the lessee is the occupier, and ought to be rated. 8 Mod. 61.

Colleges and hospitals are exempted, together with the buildings that are within the walls or limits of the same. The act 38 Geo. III. c. 5. s. 25. also exempts any master, fellow, or scholar, or exhibitioner of any such college, or hall, or any reader, officer, or master of the said universities, colleges, or halls, or any masters or ushers of any schools; or for in respect of any stipends, wages, rents, profits, or exhibitions whatsoever, arising, or growing due to them in respect to the said several places or employments; or any of the lands which before March 25, 1693, did belong to the feices of any college or hall, or to Christ's hospital, St. Bartholomew, Bridewell, St. Thomas and Bethlehem hospitals in London and Southwark; or any other hospitals or alms-houses, in respect of any rents, or revenues, which, before March 25th, 1693, were payable to them, being to be received and disbursed for the immediate use and relief of the poor of the said hospitals and alms-houses only. Id. s. 25.

But this shall not discharge any tenants of any houses or lands belonging to the said colleges, halls or hospitals, alms-houses, or schools, who, by their leases, or other contracts, are obliged to pay and discharge all rates, taxes, and impositions. Id. s. 26.

All such lands, revenues, or rents belonging to any hospital or alms-house, or settled to any charitable or pious use as were assessed in 4 W. & M. shall be liable; and no other lands, revenues, or rents, then belonging to any hospital, or alms-house, or settled to any charitable or pious use, shall be charged or assessed: but lands given to charities since the 4 W. & M. shall not be exempted. No poor person shall be charged, whose lands, &c. are not of the full yearly value of 20s. in the whole. The assessors themselves are assessed by the commissioners. The land-tax shall be paid by the tenant, who shall deduct it out of his rent. Papiists

and reputed papists, being 18 years of age, who shall not have taken the oaths of allegiance and supremacy, shall pay double land-tax. By 10 Geo. III. c. 6. s. 113. estates doubly taxed, coming to Protestants, are to be discharged. At the third meeting of the commissioners, the assessors shall deliver duplicates of the assessment in writing, signed by them, to the commissioners, with the names of proper collectors, for whom the parish or place shall be answerable. One of the duplicates, signed by three or more commissioners, shall be delivered to the collectors, with warrant for collecting; and the time and place of appeals shall then be appointed. The fourth meeting is that of appeal, notice of which shall be given in the church; and every person intending to appeal shall give a written notice to one or more assessors, that they may attend to justify the assessment. The commissioners are empowered to give relief in case of overcharge, and cause the sum abated to be re-assessed: and when the appeal is determined, it is absolutely final. If any person refuse or neglect to pay to the collector on demand, he may levy the sum assessed by distress and sale of the goods of the person neglecting or refusing to pay; and for want of distress he may be committed by warrant of two commissioners to the common gaol, until payment of the money assessed and of the charges. The collector is required to pay the money received to the receiver-general, or his deputy, quarterly, on or before June 24th, Sept. 29th, Dec. 25th, and March 25th; who shall give a receipt gratis: the collectors are allowed 3d. in the pound, which they may detain out of the last payment; but if any collector detains the money longer than the time appointed, or pays it otherwise than directed, he shall forfeit not exceeding 40s. nor less than 5s. to be levied by distress; and if he refuse to pay it, two commissioners may imprison him, seize his estates real and personal, and sell them for payment. The receiver-general is appointed by the king, or in pursuance of his directions, and has a salary allowed him by the lords of the treasury, not exceeding 2d. a pound: notice of his appointment is to be given to the commissioners, before the time of the first quarterly payment. The receiver, within twenty days after the receipt, shall pay the money into the exchequer, or forfeit 500l. to him who shall sue. The clerks of the commissioners are allowed 1½d. in the pound for writing the assessments, duplicates, &c. to be paid by the receiver-general, according to the warrant of two commissioners. Assessors, collectors, &c. not doing their duty may be fined by three or more commissioners, in any sum not exceeding 40s. 38 Geo. III. c. 5. Blackst. Com. vol. i. Burn's Justice, art. LAND-TAX.

LANDVELLER, in *Geography*, a town of Sweden, in West Gothland; 9 miles E. of Gothenborg.

LAND-WAITER, an officer of the custom-house, whose duty is, upon landing any merchandize, to examine, taste, weigh, measure them, &c. and to take an account thereof. In some ports they also execute the office of a coal-waiter. They are likewise occasionally styled searchers, and are to attend and join with the patent searcher, in the execution of all cockets for the shipping of goods to be exported to foreign parts; and in cases where drawbacks or bounties are to be paid to the merchant on the exportation of any goods, they, as well as the patent searchers, are to certify the shipping thereof on the debentures.

LANE, in the *Military Art*, is used when men are drawn up in two ranks facing one another. This is called *marching a lane*, and is generally done in the streets through which a great person is to pass, as a mark of honour. But soldiers are often drawn up in this manner, when an offender is to run the gantlope. See *Military EXECUTION*.

LANE, in *Geography*, an island in the Atlantic, near the coast of America, a little to the east of Scuttock Point. N. lat. 44° 18'. W. long. 67° 56'.

LANE, a river of Ireland, in the county of Kerry, which rises in Maglicuddy's reeks, and receiving several streams from Mangerton, and other adjoining mountains, and the river Flesk from the westward, flows north-westward to Calkemain harbour. The expanse of the waters of this river, confined by a great ledge of rocks, forms the two lakes, so well known and so justly celebrated as the upper and lower lakes of Killarney, from the town of that name being near them. See KILLARNEY.

LANEL, a town of Africa, and capital of the kingdom of Galam, on the S. side of the Senegal.

LANERK. See LANARK.

LANES, a town of Sweden, in the province of Angerman-land; 30 miles N. of Hernösand.

LANESBOROUGH, a post-town of America, in Berkshire county, Massachusetts, N. of Pittsfield six miles. It has two quarries of marble, and contains 1448 inhabitants.

LANESBOROUGH, a small town of Ireland, in the county of Longford, on the bank of the Shannon, over which there is a bridge into the county of Roscommon, in which it has a suburb. This is a borough town, which was disfranchised by the Union, and is 62½ miles W.N.W. from Dublin.

LANFRANC, in *Biography*, archbishop of Canterbury in the eleventh century, was a native of Italy, and born at Pavia, at which place his father was keeper of the public archives; he pursued his academical studies at Bologna, paid particular attention to rhetoric and civil law, and on his return to his native city, he commenced advocate in the courts. He removed to France, under the reign of Henry I., taught publicly in the school of Avranches, and was attended by a crowd of students of high rank. In a journey from that place to Rouen he was beset by robbers, who plundered him, and left him bound in a forest near the abbey of Bec. Here he remained, in a most deplorable state, till next day, when he was released, carried to the abbey, and soon after he took the monk's habit. While he resided in this place, his literary fame and excellent character recommended him to the esteem of William I., duke of Normandy, who made him one of the counsellors of state. Under the pontificate of Leo IX. he went twice to Rome; the principal object of his second journey was to solicit a dispensation for the marriage of William with the daughter of the earl of Flanders, his first cousin, which was granted upon the condition that the duke and his lady should build a monastery. They accordingly gave directions for the building of that named St. Stephen, at Caen, of which Lanfranc was appointed abbot in the year 1063. Soon after William was seated on the throne of England, he sent Lanfranc to Rome, to negotiate with Alexander II. about the mission of legates to England, to crown him, and to regulate the affairs of the church. After the coronation of William, he formed the design of depriving many of the English clergy of their dignities, in order that he might bestow them on his countrymen, or on others, on whose attachment he could depend: in conformity with this principle, Stigand, archbishop of Canterbury, was deposed, and Lanfranc raised to the high office in his stead: he would gladly have declined the honour, but an express order from pope Alexander II. obliged him to accept it. He was accordingly consecrated archbishop of Canterbury in 1070, and in the following year he went to Rome, in company with the archbishop of York, and was received with uncommon respect by his holiness, who had formerly been his pupil at the abbey of Bec. Lan-

franc defended before the pope the claims of his see to superiority over that of York. Alexander, however, unwilling to offend either of these prelates, or to disoblige the king of England, refused to give judgment in the matter, and declared that it ought to be determined by an English synod. Two councils were held for this purpose in 1072, in which the question was debated with much warmth, in the presence of the king, queen, and the whole court, and at length determined in favour of Canterbury. After this, Lanfranc presided at different councils, in which several ecclesiastical canons were made, by some of which a change was produced in the condition of the clergy, as well as in the creed of the church of England. By one, the secular clergy who had wives were allowed to keep them; but those who had not wives were forbidden to marry, and bishops were prohibited in future to ordain any man who had a wife. By another, the doctrine of transubstantiation was promulgated, which before this period was but little known in our island: Lanfranc was, however, one of its most zealous champions, and employed the weapons of dialectics, with great ingenuity and address, in defence of it, both before and after his elevation to the see of Canterbury. Having presided over the diocese nineteen years, he died in 1089, leaving behind him a high character for wisdom, learning, munificence, and other virtues. His munificence in the way of alms-giving has been very highly extolled; he is said to have given away upwards of five hundred pounds a year, a sum which must have been equal to eight or nine thousand pounds at present. As an author, the archbishop maintained a high rank for the age in which he lived, and his works are written in good Latin: these are "Commentaries upon the Epistles of St. Paul;" "A Commentary on the Psalms;" "A Treatise on Confession;" "A Dissertation concerning the Body and Blood of Christ in the Eucharist;" and a collection of letters to pope Alexander II.; to Hildebrand, while archdeacon of Rome, and to several bishops in England and Normandy. They were collected, and published in 1648, in a folio volume. Moreri. Mosheim. Henry's Hist.

LANFRANC, a physician and surgeon of Milan in the thirteenth century. He left his native country, in consequence of some persecutions that he had suffered during the troubles of the times, and went to France; and in the year 1295, having already obtained considerable reputation, he was invited to Paris by many members of the faculty. His dexterity as an operator, his candour, and the energy with which he communicated his knowledge to others in his lectures, gained him the respect and esteem of his professional brethren; and he certainly contributed to the advancement of surgery, which was at that time at a very low ebb in France. Nevertheless he held some opinions adverse to the progress of the art; he condemned the use of the trepan, and absolutely forbade the operation of lithotomy, alleging that the extraction of a calculus rendered the patient impotent. He pointed out in strong terms the impropriety and danger of tents, which were generally employed at that time; the practice, however, continued to be resorted to long after his animadversions were made.

He left two works in MS., which were deposited in the king's library at Paris; the one entitled, "Chirurgia parva," the other, "Ars completa totius Chirurgiæ, sive Practica major." They were printed at Venice in 1490, with the title of "Chirurgia magna et parva," in folio; and have undergone several subsequent editions, and have been translated into the French and German languages. Eloy. Dict. Hist.—Hutchinson Biog. Med.

LANFRANCO, GIOV. MARIA DA TERENTIO, in 1538 published his *Scintille di Musica*, or "Sparks of Music," a work.

a work which, notwithstanding its quaint title, is often quoted with great praise by subsequent writers. It is now so scarce, that it would be difficult to find a copy of it throughout Italy.

LANFRANCO GIOVANNI, a painter of history, whose principal merit was the freedom and ease with which he managed large compositions in their colour and execution, but to the great loss of character and expression. He was born at Parma in 1581, and was at first a disciple of Agostino Caracci, but afterwards studied under Annibale, and having obtained a great proficiency of handling, was employed by that master in his great work in the Farnese palace at Rome, part of which he executed so well, that the difference between his painting and that done by Annibale himself is scarcely to be discerned.

Endowed by nature with a lively imagination, and having, after he left the Caracci, (under whom he had learnt the art of composition,) paid great attention to the artificial style of Correggio, particularly in the Duomo at Parma, and in the cupola there, he obtained a fondness for fore-shortening, losing sight of the simplicity of nature, and indulging his fancy in ideal forms and groups, which, while they exhibit his skill, deprive him of a reputation for judgment or true taste. He was, as M. Fuseli has observed, "a machinist in art of the first order, and taught his successors the means of filling the eye at a great distance, by partly painting and partly leaving it to the air to paint."

His colour was powerful and rich, but not pure. He most frequently employed very dark shadows, which give his pictures a heavy and sombrous appearance; and not being well versed in chiaro-scuro, the lights in them are not frequently ill connected, or rather lack connection, and are too much in detached spots. With those who prefer spirit and dash to more studied perfections, Lanfranco will, notwithstanding his deficiencies, be always a favourite.

He was engaged by Urban VIII. to paint the miracle of St. Peter walking on the water for the grand cathedral, dedicated to that saint in Rome, and he afforded his patron so much pleasure by his labour, that his holiness conferred the honour of knighthood upon him.

His pencil being exceedingly rapid, and his life prolonged to the age of 66, his works are by no means scarce, but are to be met with in most collections. He died in 1647.

LANG, JOHN MICHAEL, a German Protestant divine, was born at Ezelwangen, in the duchy of Sultzbach, in the year 1664. Having received a good classical education, he was sent to the university of Altdorf, in 1682, and there applied himself with great ardour to those studies which were to fit him for his future profession. He excelled particularly as an oriental scholar, and was admitted to the degree of M.A. in 1687, and then went to the university of Jena, where he delivered public lectures on ethics and natural theology. He officiated several years as pastor to a country church in the palatinate, but becoming dissatisfied with a country life he removed to Altdorf, where he was created doctor, and admitted into the academical senate in 1697. Here he was elected to the professorship of divinity, and appointed pastor of one of the churches. After some years he was involved in theological disputes, which ended in his quitting Altdorf, and removing to Prentzlow, in the year 1710, where he obtained an appointment, in which he remained till 1737, when he died, at the age of sixty-seven. He was author of the following among other works then held in high estimation: "Disertationes Botanico-Theologicæ;" "Philologia Barbaro-Græca;" "De Fabulis Mohammedicis." Moreri.

LANG, in *Geography*, a narrow island of Denmark, some-

what more than two miles in length, situated in the Baltic, near the S. coast of Laaland. N. lat. 54° 42'. E. long. 11° 20'.

LANGANICO, or SUNNI, anciently Olympia, a town of the Morca, on a small river called Carbon, the ancient Alpheus, once a city of great note, near which were celebrated the "Olympian games," which see. See also OLYMPIA. It is now an inconceivable place; 60 miles S.W. of Corinth.

LANGAROOD, a town of Persia, in the province of Ghilan, near the S. coast of the Caspian sea, which gives name to a road for ships. The cove has 10 feet water, but the entrance is narrow. The silk manufacture is here in high estimation; 20 miles S.E. of Reshid. N. lat. 27° E. long. 50° 15'.

LANGASCHANTZ, a town of Sweden, in the province of Harjedalen; 110 miles S.W. of Sundswall.

LANGBAINÉ, GERARD, in *Biography*, was born at Barton-kirk, in Westmoreland, about the year 1608. In 1626, he was admitted a servitor of Queen's college, Oxford, of which he became a scholar and afterwards a fellow. He took his degree of M.A. in 1633, and of D.D. in 1646. He had, however, some years previously to his taking the last degree, made himself known as a man of erudition, by an edition of Longinus, Greek and Latin, with notes, printed at Oxford in 1636. This work was followed by others of an historical and critical kind, displaying much sound learning, and an ardent attachment to the existing order of things in church and state. He was in habits of correspondence with the learned Usher and Selden, and is referred to by bishop Nicholson as a person admirably skilled in the antiquities and laws of England. In 1644, the university, of which he was a member, appointed him keeper of its archives, and in the following year he was made provost of his college. He readily submitted to the changes which took place at this period, and was accordingly allowed to remain in peace, employing his time and talents in the promotion of learning, and the maintenance of academical discipline. He died in the enjoyment of both his offices, in the year 1658. He had a son of the same name, who is known by his "Appendix to a Catalogue of Oxford Graduates;" and "A New Catalogue of English Laws."

LANGDON, in *Geography*, a township of America, in Cheshire county, New Hampshire, incorporated in 1787, and containing 484 inhabitants.

LANGE, or LANGIUS, JOHN, in *Biography*, a physician of reputation, was born at Loewenburg, in Silesia, in the year 1485. He pursued his studies with singular zeal at Leipzig, Bologna, and Pisa, in the latter of which universities he was honoured with the degree of M.D. He then settled in the practice of his profession at Heidelberg, where he soon acquired the esteem of the public, and was nominated first physician to four successive electors palatine; one of whom, Frederic II., he accompanied in his travels through the greater part of Europe. He attained the age of eighty, notwithstanding his excessive use of cheese, which made a part of all his meals, asserting that physicians were mistaken in decrying, as indigestible, this his favourite nutriment. He died at Heidelberg in June, 1565.

The most esteemed of his works is entitled "Medicinalium Epitolarum Miscellanea," first published at Basle, in 1554, 4to. This edition contains but eighty-three pills; but these were greatly multiplied in the subsequent editions. The work was full of the various learning of the times; and he in a great measure anticipated Sydenham in recommending the cool regimen in inflammatory diseases. He likewise published the following works: "De Syrmaismo et ratiore purgandi

purgandi per vomitum, ex Egyptiorum invento et fornicula," 1572, 8vo—"De Scorbuto Epitolaræ duæ," 1624; together with the treatise of Sennertus on the same subject.—"Confilia quædam et experimenta," 1676, 4to. together with the Confilia Medicinalia of Velschius. Eloy. Dict. Hill.

LANGEAC, in *Geography*, a town of France, in the department of the Upper Loire, and chief place of a canton, in the district of Brioude; 12 miles S. of Brioude. The place contains 1807, and the canton 9753 inhabitants, on a territory of 232½ kilometres, in 16 communes.

LANGEAIS, a town of France, in the department of the Indre and Loire, and chief place of a canton, in the district of Chinon, seated on the Loire; 12 miles W. of Tours. The place contains 2229, and the canton 9465 inhabitants, on a territory of 324½ kilometres, in 12 communes. N. lat. 47° 18'. W. long. 0° 1'.

LANGEDORF, a town of Germany, in the duchy of Wurzburg; 7 miles S.W. of Kissingen.

LANGEFORD, a small island near the coast of Lapland. N. lat. 69° 38'.

LANGELAND, a fertile island of Denmark, situated in the south part of the Great Belt, between the islands of Laaland and Funen, about 30 miles in length, and from three to five in breadth. It was formerly a principality, but is now only a county, the best in the kingdom, and under the same government as Funen. The chief town is Rudkiøping. N. lat. 55°. E. long. 10° 50'.

LANGELMAKI, a town of Sweden, in the province of Tavastland; 42 miles N. of Tavasthus.

LANGELSHEIM, a town of Westphalia, and principal place of a bailiwick, in the principality of Wolfenbuttle; 6 miles N.W. of Goslar.

LANGENAU, a town of Prussia, in the province of Oberland, the church of which is celebrated for beautiful paintings; 8 miles N. of Bischofswerder.—Also, a town of Prussia, in the province of Ermeland; 25 miles N.W. of Heilsberg.—Also, a town of Bavaria, situated on a small river, which runs into the Danube; 11 miles N.E. of Ulm.

LANGENBERG, a town of the duchy of Berg; 15 miles N.E. of Duffeldorf.

LANGENBURG, a town of Germany, in the principality of Hohenloe, on the Jaxt; 32 miles W. of Anspach.

LANGENES, an island in the North sea, near the coast of Norway, about 24 miles in circumference. N. lat. 59° 20'.

LANGENFELD, a town of Saxony, in the Vogtland; 40 miles S.S.W. of Zwickau.

LANGEN-SALZA, a town of Saxony, the capital of Thuringia, on the Salza. Its environs are pleasant and manufactures flourishing. It contains about 900 houses, two churches, a college, and a castle; 14 miles W. of Erfurt. N. lat. 51° 4'. E. long. 10° 42'.

LANGENSCHWALBACH, a town of Westphalia, in the county of Katzenhogen, celebrated for its mineral waters; 9 miles N.W. of Mentz.

LANGEN-SEE. See LAKE.

LANGENTHAL, a town of Switzerland, in Berne, advantageously situated for commerce with France and Germany; for the convenience of which it has three fairs, at which are annually sold from 10,000 to 11,000 pieces of linen, 8000 of which are whitened; these are exported to Spain, Portugal, America, &c. Cheese is likewise sold here in great quantities, besides horses, cattle, grain, and many other articles, both of agriculture and manufacture.

In its vicinity are mineral springs; 18 miles N.E. of Berne. N. lat. 47° 12'. E. long. 7° 33'.

LANGENZENN, anciently called *Cinna*, or *Cenna*, a town of Germany, on the river Zenn; 12 miles W. of Nuremberg.

LANGEROGE, a small island in the German sea, near the coast of East Friesland, with a small town. N. lat. 53° 42'. E. long. 7° 24'.

LANGESCHEED, a town of Westphalia; 25 miles W. of Brilon.

LANGESUND, a sea-port town of Norway, in the diocese of Christiania; 50 miles S.S.W. of Christiania.

LANGEWANG, a town of the duchy of Stiria; 16 miles N.E. of Pruck.

LANGFORD, a town of America, in the state of Kentucky; 25 miles E.S.E. of Stamford.

LANGFORD Bay, a bay of the island of Antigua, on the N. coast, W. of Peyerlon's Point.

LANGHOLM, a small island on the E. side of the gulf of Bothnia. N. lat. 65° 45'. E. long. 21° 40'.

LANGHOLM, a market-town and burgh of barony under the duke of Buccleugh, is situated in a parish of the same name, in the district of Eskdale and county of Dumfriess, Scotland. The population of this town is stated, in the parliamentary reports of 1801, at 2039 persons, but it is presumed, this number includes the whole parish. A market is held here every week, and four fairs annually; that held on the 26th of July is considered as the greatest in Scotland for lambs. At a short distance from the town is the village of New Langholm, which has been erected by the duke of Buccleugh for the establishment of an extensive cotton manufactory. The country along the banks of the Esk is generally flat, well sheltered with woods, and yield luxuriant crops, particularly of oats and barley. The other parts of the parish consist chiefly of small hills, covered with verdure, and affords excellent pasture for sheep. The duke of Buccleugh has built in this neighbourhood a very handsome mansion called Langholm-lodge, which stands in a delightful valley.

LANGHORNE, JOHN, in *Biography*, an excellent English poet, was born at Kirkby-Stephen, in Westmoreland, in 1735. By the death of his father, the education of John and three other children devolved upon his mother, who fulfilled the task with great assiduity and affection. He received his school-learning at Appleby under Mr. Yates, who joined elegance of taste to the acquirements of a classical scholar. Langhorne continued under his tuition till the age of eighteen; when the narrowness of his circumstances obliged him to engage himself as domestic tutor in a family, near Ripon. He made himself known as a poet, by a poem entitled "Audley-park," descriptive, as its title imports, of the beauties of that place. He soon after became an assistant at the free-school of Wakefield, and taking orders, acquired popularity as a preacher. In 1759, he undertook the tuition of the sons of Robert Cracroft, esq., of Hackethorn, near Lincoln, and while in this situation he made a collection of such miscellaneous poems as he had written, and published them in a volume for the benefit of a friend in distress. In the year 1760, he entered himself at Clare hall, Cambridge, for the purpose of taking a degree, and dated from that place a poem on the king's accession, printed in the University collection of verses on that occasion. In 1761, he officiated as curate to the clergyman of Dagenham, in Essex, and at the same period he published several poems, which made him generally known among the votaries to the Muses, and in 1762, he appeared as a prose writer by his "Letters on religious Retirement, Melancholy, and Enthusiasm."

fiain,' and by his eastern tale of "Solyman and Almehna." He was, at this time, likewise a writer in the Monthly Review. His next work, published in 1763, entitled "Letters supposed to have passed between Theodosius and Conflantia," founded on a story in the Spectator, became popular, and obtained for the author much applause. Mr. Langhorne, in the following year, removed to the metropolis, where he was appointed curate and lecturer of St. John's, Clerkenwell, and in the same year he published two volumes of sermons, which he entitled "Tracts of religious Philosophy." Dr. Hurd now appointed him assistant preacher at Lincoln's-Inn, and Mr. Langhorne soon after gave the public his "Letters on the Eloquence of the Pulpit;" and "Letters to and from select Friends, or Effusions of Friendship and Fancy." He is said to have published a defence of lord Bute; but a pastoral poem, entitled "Genius and Valour;" he avowed, the object of which was to vindicate the natives of Scotland from the rancorous abuse thrown upon them by Churchill. This obtained for the author a complimentary letter from the university of Edinburgh, with a diploma of doctor of divinity. He had, in the year 1760 or 1761, quitted the family of Hæckthorn, on account of being refused the hand of one of Mr. Cracroft's daughters; in 1767, when he had obtained a station of much greater respectability, and when he was looked up to as an author and clergyman, he renewed his suite, and was successful. The living of Blagdon, in Somersetshire, was purchased, which afforded the newly-married couple a desirable residence, but this happy union was fatally dissolved by the death of Mrs. Langhorne in child-bed, in the ensuing year. Life now seemed to have lost its charms on the survivor, he quitted a place which served only to remind him of his heavy affliction, and retired to the house of his brother William, a clergyman at Folkestone, in Kent. In this retreat, instead of giving himself up to melancholy, he very wisely occupied his mind with a literary talk of some labour and extent, and the two brothers jointly produced a new version of Plutarch's Lives, with notes critical and explanatory, and a life of the author, which was published in 1771, and met with a favourable reception. He had published, previously to this, "Letters supposed to have passed between St. Evermond and Waller," two vols.; and "Frederic and Pharamond, or the Consolations of Human Life," a philosophical discourse. His "Fables of Flora" were published in 1771, as was another poem, entitled "The Origin of the Veil." In 1772, he paid a visit to his native country, which produced a second matrimonial connection, and having indulged himself and his lady with a continental tour, he sat down again at his living of Blagdon. To the duties of the church he added those of a magistrate, and at the desire of his friend Dr. Burn, he gave the world accurate ideas of this important office in a poem, entitled "The Country Justice." The first part appeared in 1774, and was greatly admired for the manly strain of its sentiments, and the beauty of its descriptions. The two other parts were of inferior merit, and published at different periods. In 1776, he lost his second wife in child-bed, which must, to a man of feeling, have been an unusually severe calamity, and from the effects of which he probably never wholly recovered. His affliction was in a degree alleviated by the connexions that he had acquired in the great world, one of the fruits of which was, the presentation to a prebend in the cathedral of Wells, in 1777, by the bishop of that see. His health was, however, declining, yet he continued to amuse himself and the public with writings of different kinds, the last of these was a romantic tale, entitled "Owen of Carron." He died at Blagdon, in April 1779, in the

forty-fifth year of his age. He was amiable in his manners, but is said to have been rather too much addicted to convivial indulgences: if this habit was incurred by domestic misfortunes, though not to be justified, it may, in a measure, be palliated, and the subject of it is to be truly pitied. "His poetry," says an able critic, "is generally harmonious, abounding in pleasing imagery, but over-loaded with ornament, and not free from obscurity and affectation. His prose writings are rather light and flowery than solid and natural. His sermons have been censured for the loose soft texture of their style, and the false pathos of their sentiment. In religion he was inclined to enthusiasm, but the morality of all his works is pure and rational."

LANGIN, in *Geography*, a town of France, in the department of Mont Blanc; 6 miles N. of Bonne.

LANGINES, a small island of Denmark, in the North sea, near the west coast of South Jutland; 2 miles N.W. from the island of Nordstrand.

LANGIONE, a town of the kingdom of Laos, considered by some as the capital. N. lat. 22° 30'.

LANGLE'S BAY, a bay on the west coast of the island of Saghalien, so called by M. La Perouse. N. lat. 47° 49'. E. long. 142° 49'.

LANGLE'S Peak, a mountain on the north coast of the island of Jesso, said to be more than 1200 toises above the level of the sea. N. lat. 45° 25'. E. long. 142° 20'.

LANGLEY ISLAND, a small island, near the south coast of Newfoundland, about 3 miles S. from the island of Miquelon. N. lat. 46° 42'. W. long. 56° 5'.

LANGOE, a small island of Denmark, near the north coast of the island of Funen. N. lat. 55° 35'. E. long. 10° 11'.—Also, an island in the North sea, about 80 miles in circumference, and 40 from the coast of Norway, celebrated for its marble quarries. N. lat. 68° 16'.

LANGOGNE, a town of France, in the department of the Lozère, and chief place of a canton, in the district of Mende; 21 miles N.E. of Mende. The place contains 2923, and the canton 7450 inhabitants, on a territory of 250 kilometres, in 8 communes. N. lat. 44° 44'. E. long. 3° 54'.

LANGON, a town of France, in the department of the Gironde, and chief place of a canton, in the district of Bazas; 9 miles N. of Bazas. The place contains 3208, and the canton 10,602 inhabitants, on a territory of 130 kilometres, in 13 communes.—Also, a small island in the north part of the gulf of Bothnia. N. lat. 65° 32'. E. long. 22° 26'.

LANGORAN, a small island on the east side of the gulf of Bothnia. N. lat. 63° 32'. E. long. 22° 18'.

LANGPORT, a market-town and parish in the hundred of Pitney, and county of Somerset, England, is situated upon the banks of the river Parrot, near its confluence with the Irwell. It was formerly a royal borough; and the inhabitants, by immemorial custom, still claim several borough-privileges. This town consists chiefly of two streets, and is divided into two parts, called Langport-Eastover and Langport-Westover. The government is vested in a portreeve, a recorder, two capital bailiffs, and nine common-council men. The river Parrot being navigable by lighters, a considerable trade is carried on, between this place and Bridgewater, in timber, stone, coal, iron, and salt. The church, dedicated to All-Saints, is adorned with a very fine tower, which has several niches on the west side, formerly ornamented with handsome statues. Adjoining to the town are two large commons, called *Common-Moor* and *Ragg-Common*; the former consisting of 150, and the latter of 70 acres of good meadow ground, upon which all the inhabitants not only assume the right of feeding cattle, but even of building

as they deem most convenient for themselves. The houses in Langport, according to the parliamentary returns of 1800, amounted to 126 in number, and were occupied by 754 inhabitants. Here are a weekly market and three annual fairs. Collinson's History, &c. of Somersetshire, 3 vols. 4to.

LANGRAVA, a town of Portugal, in the province of Beira, having a medicinal spring; 12 miles N.W. of Pinhel.

LANGREL-SHOT, is a sort of shot sometimes used at sea, made of two bars of iron, with a joint, or flackle, in the middle; by which means it can be shortened, and so put the better into the gun; and at each end there is a half bullet, either of lead or iron.

This shot, when discharged, flies out expanded, and so does more execution among the enemies rigging, &c. It is never used in royal ships, but very often by privateers and merchantmen.

LANGRES, in *Geography*, a town of France, and chief place of a district, in the department of the Upper Marne. In the time of Julius Cæsar, this was the capital of the Lingones. On the irruption of Attila, it was taken and burnt; and after having been rebuilt, the Vandals destroyed it. It was, at an early period, erected into a bishopric; and from the reign of Philip Augustus to the revolution, the prelates were peers of France. It afterwards belonged to Burgundy, and fell with the rest of that kingdom to France. N. lat. 47° 52'. E. long. 4° 25'.

LANGRISH, BROWN, in *Biography*, a physician of the last century, who distinguished himself as an advocate for the mechanical theories of physiology and medicine, and by the numerous experiments with which he supported those doctrines. A more accurate investigation of the nature of the animal economy has exploded them; but Dr. Langrish had the merit of ascertaining several interesting facts in respect to the nature of the circulating powers. He died in London, on the 29th of November 1759, and left the following works: "A new Essay on Muscular Motion, founded on Experiments, &c." 1733, 8vo.; "Modern Theory of Phytic," 1738, 8vo.; "Physical Experiments upon Brutes," 1745, 8vo.; "Croonian Lectures on Muscular Motion," 1747. Eloy. Dict. Hist.

LANGSELE, in *Geography* a town of Sweden, in Angermannland, on a river of the same name; 45 miles N.W. of Hernösand. N. lat. 63° 14'. E. long. 16° 49'.

LANGSKAR, a small island on the east side of the gulf of Bothnia. N. lat. 63°. E. long. 21° 9'.

LANGTON, STEPHEN, in *Biography*, archbishop of Canterbury in the 13th century, was a native of England, but was educated at the university of Paris, where he afterwards taught divinity, and explained the Scriptures with much reputation. His character stood so high, that he was chosen chancellor of that university, canon of Paris, and dean of Rheims. He was afterwards sent for to Rome by pope Innocent III., where he was created a cardinal. In the year 1207, the monks of Canterbury having, upon a vacancy taking place in that see, made a double return, both parties appealed to the pope, and sent agents to Rome to support their respective claims. His holiness not only determined against both the contending candidates, but ordered the monks of Canterbury, then at Rome, immediately to proceed to the election of an archbishop, and, at the same time, commanded them to choose cardinal Stephen Langton. After various excuses, which the pope knew how to get over, by absolving the agents in the business from all sorts of promises, oaths, &c. and by threatening them with the highest penalties of the church, they complied, and

Langton was consecrated by the pope at Viterbo. As soon as the news arrived in England, king John was incensed in the highest degree both against the pope and monks of Canterbury. The last, being within the reach of his power, experienced the effects of his indignation. He sent two officers with a company of armed men to Canterbury, took possession of the monastery, banished the monks out of the kingdom, and seized all their property. He wrote a spirited letter to the pope, whom he accused of injustice and presumption, in raising a stranger to the highest dignity in his kingdom, without even his knowledge; and he added, that if his holiness did not instantly repair the injury, he would break off all communication with Rome. John, unfortunately for himself and his kingdom, was unfit for so arduous a contest; and he, in the end, submitted to the most disgraceful terms. (See JOHN, and INNOCENT III.) In 1213, cardinal Langton arrived in England, and took possession of the see; and though he owed all his advancement to the pope, yet the moment he became an English baron, he was inspired with a zealous attachment to the liberties and independence of his country. In the very year in which he came over, he and six other bishops joined the party of the barons, who associated to resist the tyranny of the king; and at length they were successful in procuring the great charter. Langton was equally zealous in opposing the claims of the papal agents, particularly of the pope's legate, who assumed the right of regulating all ecclesiastical affairs in the most arbitrary manner. In the grand contest which took place between king John and the barons about the charter, the archbishop's patriotic conduct gave much offence to the pope, that, in 1215, he laid him under a sentence of suspension. Nevertheless, in the following year, we find Langton assisting at a general council held at Rome; and during his absence from England at this time, king John died. In 1222, he held a synod at Oxford, in which a remarkable canon was made, prohibiting clergymen from keeping concubines publicly in their houses, or from going to them in other places so openly as to occasion scandal. In the following year, he, at the head of the principal nobility, demanded an audience of king Henry III., and demanded of him a confirmation of the charter of their liberties. Their determined manner convinced the king that their demand was not to be refused, and he instantly gave orders for the assembling of parliament. The archbishop shewed, in several instances, that he was friendly to the legal prerogatives of the crown; and by a firm and impressive conduct, in a case of great difficulty, he prevented the calamity of a civil war. He died in the year 1228, leaving behind him many works, which prove that he was deserving the character of being as learned and polite an author as any of the age in which he flourished. He wrote "Commentaries" upon the greatest part of the books of the Old and New Testament. He was deeply skilled in Aristotelian dialectics, and the application of them to the doctrines of Scripture. The first division of the books of the Bible into chapters is ascribed to this prelate. The history of the translation of the body of Thomas à Becket was printed at the end of that archbishop's letters, at Brussels, 1682. His letter to king John, with the king's answer, may be seen in d'Archevry's Spicilegium. Moheim's Eccl. Hist. Henry's Hist. of Eng.

LANGTON, in *Geography*, a town of Scotland, in the county of Berwick; 2 miles S.W. of Greenlaw.

LANGUAGE, a set of words which any people have agreed upon, whereby to communicate their thoughts to each other. Or, language, in general, signifies the expression of our ideas by certain articulate sounds, which are used as the signs of these ideas. See ARTICULATION.

Whatever be our opinion respecting the progressive amelioration of brutes, if the capacity of language were communicated to them, there can be no hesitation in admitting the progressive deterioration of the human species, if they were deprived of it. If man had not possessed this, or some other extensive power of communication, that astonishing system, which we call the human mind, would have remained in inactivity, its faculties torpid, its energies unexcited, and that capacity of progressive improvement, which forms so important a part of the mental constitution of man, would have been given in vain, would have been unknown, except to him who gave it. But in every part of the creation we discern a unity of design, which equally proves the wisdom and benevolence of the great First Cause. The means of bringing his powers into activity are bestowed upon man, as well as the powers themselves; and it is a position which will bear a vigorous examination, that the accuracy of human thought and the extent of human intellect generally proceed in equal steps with the accuracy and extent of language. "This ineliminable prerogative," says Smellie, "is perhaps one of the greatest secondary bonds of society, and the greatest improvement to the human intellect. Without artificial language, though nature has bestowed upon every animal a mode of expressing its wants and desires, its pleasures and its pains,—what a humiliating figure would the human species exhibit, even upon the supposition that they did associate. But when language and society are conjoined, the human intellect, in the progress of time, arrives at a high degree of perfection. Society gives rise to virtue, honour, government, subordination, arts, sciences, order, happiness. All the individuals of a community conduct themselves upon a regulated system. Under the influence of established laws, kings and magistrates, by the exercise of legal authority, encourage virtue, repress vice, and diffuse through the extent of their jurisdiction the happy effects of their administrations. In society, as in a fertile climate, human talents germinate and are expanded; the mechanical and liberal arts flourish; poets, orators, historians, philosophers, lawyers, physicians, and theologians, are produced. These truths are pleasant, and it were to be wished that no evils accompanied them: but through the whole extent of nature it appears to our limited views, that good and evil, pleasure and pain, are necessary and perpetual concomitants." It will not appear too much to affirm, when we consider the influence of language on the intellect, that if that genius, which has dazzled the world with its splendour and extent, had been originally destitute of the power of communication, he would not have risen above the level of the least cultivated of his fellow-mortals. Conceive him (to use the ideas of Condillæ) bereft of the use of visible signs, how much knowledge would be concealed from him, attainable even by an ordinary capacity! Take away from him the use of speech,—the lot of the dumb teaches you in what narrow bounds you enclose him. Finally, deprive him of the use of all kinds of signs; let him not know how to make with propriety any gesture;—you would have in him a mere idiot.

We are far, however, from believing, with Lord Monboddo, that the human race have actually risen from the very lowest stage,—that of mere brutality. His lordship's opinion is too singular to be omitted here. He supposes, on the authority of several travellers whom he quotes, (and of whose passion for the marvellous his quotations leave no room to doubt,) that there are nations without laws, or any of the arts of civilized life, without even language; and that some of them, to complete their relationship to the monkey tribe, had actually tails. This, with other opinions, which

display rather the credulity of the man of system than the sober and cool judgment of the philosopher, has been exposed to the lively ridicule of Horne Tooke: and though we will never to countenance the idea, that ridicule is a proper test of truth,—we are willing to admit, that there are some opinions which it is below the dignity of reason to refute.

We see in language a complicated whole, which we have been accustomed to consider as it is, without attempting to ascertain what it has been. We see all regularity and beauty; and we do not ask ourselves the question, has language always been thus regular and beautiful? When we look back into the earlier periods of human nature, we find that that which now wears the appearance of art was early the invention of necessity, gradually perfected and brought to a systematic form, by causes which have operated generally, but have received modification from the influence of local or temporary circumstances. A complete system of the origin and progress of language would be a history of the progress of human intellect. This we shall not attempt; perhaps our resources of knowledge are not sufficient to render the attempt in any degree successful; but a short outline of the early history of language, particularly of written language, will be neither uninteresting nor useless.

Our direct evidence is not extensive, and we are too much obliged to have recourse to hypothesis, in tracing the progress of improvement in any department of science. We are unable always to ascertain (as Mr. Stewart observes) how men have actually conducted themselves on particular occasions; and we are then led to inquire in what manner they are likely to have proceeded from the principles of their nature, and the circumstances of their external situation. In such inquiries, the detached facts which the remains of antiquity, or the narration of travellers, afford us, or the actual appearances of language at present, serve as landmarks for our speculations. "In examining the history of the human mind, as well as in examining the phenomena of the natural world, we cannot always trace the progress by which an event *has been* produced; and it is frequently of importance to discover how it *may have been* produced, by causes known to exist. The steps in the formation of language cannot probably be determined with certainty; yet if we can shew the known principles of human nature, how the various parts may naturally have arisen, the mind is not only to a certain degree satisfied, but a check is given to that indolent philosophy which refers to a miracle whatever appearances, either in the natural or moral world, it is unable to explain."

Diodorus Siculus (lib. i.) and Vitruvius (*Archit.* lib. ii. c. 21.) supposed that the first men lived for some time in the woods and caves, like the beasts, uttering only confused and inarticulate sounds; till associating for mutual assistance, they came by degrees to use articulate sounds, mutually agreed upon for the arbitrary signs or marks of those ideas in the mind of the speaker, which he wanted to communicate to the hearer. By what degrees they proceeded from inarticulate to articulate sounds, these writers do not attempt to point out; and unless we admit that these articulate sounds were connected with certain feelings, in the same manner as what are called the natural signs, or that they were easily produced, which will not be allowed by those who have attended to the structure of the organs of speech, the account we have received from a better informed historian will not lose ground.

Plato, in *Cratyl.* p. 383. p. 425. ed. Serrani, seems to maintain, that the first language was of divine formation; for he supposes that the names of things had originally some natural connection or congruity with the things themselves,

and that the first names must have been justly imposed, because they were imposed by the gods.

Moses, however, on whose authority we may more confidently depend, gives us to understand that the rudiments of language were begun by man, under the superintendence of his Maker. The Supreme Being caused all the animal creation to pass before their lord, to receive from him their names. If we consider that the numerous varieties which we observe in the subordinate classes of the brute creation probably originated in a comparatively small number of individuals, as the almost equally numerous varieties of men sprang from our great progenitor, this almost endless task, as it at first sight appears, is very much reduced in its magnitude. Here is the first step. Miracles are never used except when they are necessary, that is, when the same effect cannot be produced by the common laws of nature: and hence we feel inclined to believe, that here the divine communication ceased; and that what man had been instructed to begin, he was left to complete for himself. Indeed, if we suppose that more than the application of names to natural objects had been divinely taught, yet we must admit that these communications would be bounded by the wants of the being to whom they were made. It is not probable that the divine instructor would lead man to fix upon words, to denote things then unknown, or to denote ideas which were not then acquired. "It is not necessary to suppose," says Kett, "that the Creator inspired the first parents of mankind with any particular original or primitive language; but that he made them fully sensible of the power with which they were endued of forming articulate sounds, gave them an impulse to exert it, and left the arbitrary imposition of words to their own choice." This seems to be intimated Gen. ii. 19. See Shuckford's Connection, vol. i. book ii. p. 111.

Let us then suppose the use of articulation given, and its application in some instances pointed out, in the invention of the names of animals; which, we may observe, is, in fact, the first step that would probably have been taken, presupposing the power of articulation, if no divine direction had been given. Words would originally be simply the signs of things, and farther of individuals. Every new object, for which necessity required a name, would receive a different name from others: but if there were a striking similarity between this new object and one which had already received a name, the old one would be transferred. One of the principles of association is similarity; and this new impression would recal the idea of the former object which it resembled, and consequently the word with which it was connected: and thus what originally was a name only for an individual, would gradually become the name of a multitude. Thus Lee Boo, who had been taught by his fellow-voyagers to call a great Newfoundland dog by the name of Sailor, used to call every dog he saw Sailor. There is little or no difficulty attending the application and classification of sensible objects: it seems to be an operation simple and easy, if we presuppose (as we have done) that some articulate sounds were known.

When several objects had received the same name, it would be sometimes necessary to distinguish them. Our procedure in such cases is to connect with the name of the object, the name of a distinguishing quality, or to specify some relation it has with other objects; but this supposes that to be already done, which we must consider as yet to be done. Now we must bear in mind that similarity, (sensible external similarity,) and local connection, are those principles of association, which are known to be most active at present in the minds of the illiterate and uncultivated; they must also have

been most active in the minds of all men in the rude states of society. A peculiar colour, (which would furnish one principle of distinction,) would naturally be denoted by the name of an object remarkable for that colour, and this name, joined with the general term, would confine it to the particular object it was meant to specify. This is a procedure so simple, that one may expect to find some traces of it still remaining, and it is what we actually do in common language. An orange ribbon will precisely explain our meaning. We wish to distinguish a ribbon from others by its colour; in this instance we are able, agreeably to the custom of our language, to employ the name of an object remarkable for that colour, to denote the colour itself; and it is to be observed, that sensible qualities were those, and those only, which would be first noticed, and most requisite to be noticed.

Local situation, or vicinity to some object, would furnish another ground for distinction; the fountain near the cave, for instance. Now in order to express this, the procedure would be simple and intelligible, if immediately preceding or following the term employed to denote fountain, the term denoting cave were added. As we should at present use the expression, the barn-yard, for the yard near to, or adjoining the barn; the hermitage-walk, for the walk leading to the hermitage. This juxtaposition of the signs, to signify the congruity or similarity of the objects they denote, is the most natural, and in a language little extended, sufficiently adequate for all the purposes of common life; but it is obvious that it would allow very great latitude of interpretation; and hence, as language became more copious, contrivances were used to denote the nature of the connection which subsisted between the objects denoted by the signs employed. The chief of these is the employment of prepositions, at first separately, and afterwards, in some cases, coalescing with, and forming a part of the word; and the origin of these furnishes additional proof that the procedures we have spoken of were in reality those of the early framers of language (see GRAMMAR); but these were contrivances of a late date than those of which we here speak.

By degrees it was found convenient, at least by some tribes, to designate those names which were employed, in connection with other names with a view to point some quality or restricting circumstance of the thing signified, by some note that they were so employed. The speaker might certainly have left the inference to simple juxtaposition; but this appears to have been done in few languages, after improvements began to take place; and to effect such designation words (in some cases denoting *add, join, like, &c.*) were subjoined to the particularizing names, and they then were used only as adjectives, (or, to use a more general term, as adnouns.) The Chinese, however, still make no distinction in form, between words when employed as nouns and as adnouns; the same word when placed first being an adjective, and when placed last a substantive; thus *hao gin* is a good man; and *gin te hao* is the goodness of a man. We use the same word in many instances both as a noun and an adnoun; but a large proportion of our simple adjectives are formed as above, and are never employed as substantives; the Chinese, on the other hand, when a substantive is not to be used as an adjective, add the designating syllable *ca* to it.

As far as the processes we have described regard sensible objects and their connections, all seems very plain; and we find so many traces of similar modes of proceeding in languages at present in use, that we can scarcely doubt that at least it strongly resembles the actual procedure in the early stages of language. And we may remark, as we go on,

that.

that every procedure, in order to be probable, should be simple, and such as might easily be adopted. It would not be long before art was applied to perfect and correct that which necessity began; but even this must have had the features of simplicity, must have been directed by circumstances which would not be under the controul of man. It is not probable that any variations would be formed by regular analogies, except such as really existed in the situation or connection of the object; nor that they would form any combinations of words, excepting when the objects they signified had some real or apprehended connection.

In order to express objects which were not sensible, so as to convey to others notions or feelings which existed in the mind of the speaker, words would be used which had previously been appropriated to objects to which those objects of the mind's eye appeared to have some resemblance, or other connection. This resemblance or connection was frequently forced, and to those whose situation was different would not be at all striking; in other cases it was correct, and the justness of application is proved by a similar procedure of unconnected inventors. We may derive great light here from the hieroglyphics; for there cannot be a doubt that where the visible sign which originally represented only a sensible object, was applied to denote some quality discovered by reasoning and observation, or some internal feeling, the audible sign or word was applied in a similar manner. The writing would, of course, as Warburton very justly observes, be that very picture which was before painted by the fancy, and thence delineated in words. Some instances will be adduced, when we come to consider the hieroglyphic mode of communication; at present we will add one or two as illustrations of the principles we have laid down. The term used to denote the *mouth*, denoted also *speech*; this, connected with the *dog*, signified the *dog's voice*. They proceeded further, and used this compound, at least the hieroglyphic denoting it, to signify *lamentation* and the *sorrow* which produced it. At first view this procedure appears extraordinary; to enter fully into the resemblance, we must remember that in uncultivated minds grief is loud and clamorous; and it is to a similar resemblance, that the same term has, in our own language, been applied to the cry of a dog in pain, and to the expression of lamentation among the lower classes of the Irish. It was a procedure much more natural when the term *dog* joined with the word denoting a field was made to signify *hunting*. Our readers will be able, even in the present refined period of our language, to trace numerous instances, in which the names of intellectual things have been obviously transferred from sensible things; and to those who have attended much to the subject, it will not appear too much to affirm, that in every instance where a word is not the name of a sensible object, it has acquired its present force by a gradual transition from its primary application to sensible objects. Mungo Park has furnished us with some good specimens of the commencement of this transition in the Mandingo language; thus *tellingabalid*, literally *straight-bodied*, signifies *proud*; *juju bota*, literally *the heart c me out*, signifies *angry*; a *beegee*, literally *is here*, signifies *alive*; &c. In every known language the transition has been begun; but it is only among the more refined that it has been complete. In our own, we find abundance of instances in almost every intermediate stage of the progress, as well as in its termination.

Language would proceed but awkwardly without those wheels which have been gradually made for it; but all which can be thought necessary for communication are the noun and the verb; and even of the latter, as a distinct class of words, the necessity may justly be doubted. We regard it as next to

certain that the whole of what is now (by association) implied or denoted by the verb, beyond what is denoted by the acknowledged noun, was originally mere inference from the juxtaposition of the verb-noun with another noun. We cannot indeed advance one step in oral communication, without leading our hearers to the inference that certain ideas are connected in our minds, or that we believe certain objects, properties, or events, to be connected. The connecting link, however, need not always be stated; in the first stage of language it would not exist, because the *first* words could only be names without the idea of affirmation being appropriated to any of them; and in the language of childhood it does not exist. Words are placed together; and it is easily understood that the corresponding ideas are connected in the mind. "Mamma, milk—good," would surely be understood by any one; and depending upon the ease of inference, the ancient writers (long after words had been appropriated to express affirmation) continually left their readers to make it for themselves. But how slowly, and how ambiguously, communication would, in many cases, proceed, without some appropriated link of connection, any one may be convinced by attempting to express a train of thoughts without those words which have the idea of *affirmation* associated with them, in the forms so expressing affirmation.

The chief difficulty opposing the admission of the opinion that verbs were originally nouns, arises from the peculiarities existing in the external character of verbs, the notion of time and of modes of existence and action having become associated with them, and the subject in numerous instances, and occasionally the object, having coalesced with the verb; but these are all accidental circumstances; and the mere English scholar has here advantages which the learned do not possess, because he continually meets with verbs in his own language the same in every external character as the noun, and frequently used as nouns. The point, however, to be carefully kept in view, and what must gradually remove every difficulty, is, that the only essential difference between the noun and the verb is, that the latter (of course by association) expresses affirmation; all the superadded circumstances may be convenient for communication, but are in no way necessary; and in our own language, those superadded circumstances are in most cases expressed by adjuncts and not by the verb itself. If, in any form, a word employed to express affirmation, does not express it, it ceases to be a verb. For grammatical convenience we may arrange such forms with those which express affirmation, but it is merely for convenience; *γράφω, γράφω, scribe, scribere*, are no more verbs than *γράφω, scribens, scribendi*, &c. It would prevent much mistake as to the nature of the verb, if the infinitive and imperative moods were always arranged together under the class of the *noun-state* of the verbs. The infinitive is the *verb-noun* with a termination (originally, without a doubt, *expressive* by itself, as all terminations must have been), denoting that it is to be employed as a verb; thus in the Anglo-Saxon verb *dean*, *de* is the *verb-noun*, and *an* is the verbalizing adjection; so *ναύτης, αμα*, &c. are the *verb-nouns*, and *ναυτιμους, αμα*, &c. are the *verb-nouns*, and *ναυτιμους, αμα*, &c. and *αμα*, have the respective verbalizing adjections joined to them. In short, in our opinion, the imperative is the verb-noun itself; and the notion of command, entreaty, &c. conveyed by it, is merely the inference of custom; whether we say to a servant *bread*, or, *bring some bread*, we merely specify, in the latter case, the action and the object of the action, and, in the former, the object alone; the rest is *inferred* from tone, manner, &c. The fact indisputably is, that in every department of language, fully as much is done by inference as by actual expression; and even

as it is, thought is by far too quick for words. Though we are now encroaching on the department of grammar, we must add as one confirmation of our ideas, that the Hebrew imperative is the same with what is called the radical form of the verb, in its several conjugations, except in *niphal*, where it is the same as the infinitive. But to proceed;

*Mens, fighi*, are names, and are still acknowledged as such; when they are placed together, especially if accompanied by distinguishing tones of voice, it would be naturally inferred that the speaker intended to raise in his hearer's mind that belief which exists in his own; or at least, to inform his hearer of a connection which circumstances had formed in his mind. By degrees, at least in most nations, some of those names which were frequently thus employed with the inference of affirmation, became appropriated to convey this inference, and it would then be made whenever the word was employed; but in the more simple languages, a large proportion of those verbs which are employed as verbs, (*i. e.* conveying the inference of affirmation,) are still immediately recognized as nouns. In the Chinese, very few names are appropriated as verbs, but are used indiscriminately, and without any variation of form, either as nouns or verbs; in the Hebrew, the root, (which does not, like every part of the indicative in the Greek and Latin verbs, include a pronoun,) is a simple name, and is used, in many cases, as a noun; and in our own language, many names are used either as nouns or as verbs. When we have advanced to the frequent use, and gradual appropriation of some names to convey the inference of affirmation, the rest is easy and almost certain. With respect to the simple affirmation, the subject of it would, in the case of the first and second persons, always be a pronoun, and, in the same district, the same pronoun. This, where *spoken* language made material progress, would gradually coalesce with the verb; and the word so formed would be completely invested with the verbal character, and never be employed but with the inference of affirmation. The Hebrew presents us with this coalescence in its incipient and obvious state; the Greek and Latin shew it in a much more complete state, and the component parts cannot always be detected; no reasonable doubt can however exist but that the procedure has been the same in all. The same might also be the case respecting the third person, but the coalescence would, in this instance, be more slowly formed; and in some languages where the coalescence took place in the other persons it did not in this; it must, however, be admitted that, in others, the contrary is the fact.

Respecting the changes of the verb, to make it express other circumstances besides those of affirmation, we must refer to GRAMMAR and the connected articles, and shall content ourselves with the following general remarks. There appears to us to be little or no reason to doubt, but, that all the common changes, which have taken place in the verbs of all languages, to denote the time or mode of existence and action, (as well as those of number and person,) have been formed in consequence of the coalescence of words of appropriate signification; and though the gradual refinement of language may have greatly varied the associations of words, from what they originally possessed, yet that those changes were originally found sufficient to answer their respective purposes. In some cases the contrivances adopted can be still traced; and from the new turn which has lately been given to philological speculation, we may expect other discoveries respecting the causes or origin of particular flexions. We shall only mention two instances, which will serve to shew how simple those contrivances originally were. The future of the French verb is nothing more than the infinitive of the verb, with the present tense of *avoir*;

thus *aimerai* is *ai aimer*; and *j'aimerai*, means, *I have to love*, which mode of expression is, in our own language, used with a future force. This leading distinction between the past and the future tense of the Hebrew verb is, that in the past tense the verb is placed before the fragment of the pronoun forming the person, and in the future after it; to intimate (as may be reasonably supposed) that the action has passed the subject in the first case; in the second, that it is yet to come.

The force of the pronouns (the legitimate substantive pronouns) is very clear. *I* means the person speaking; *thou*, the person spoken to; *he, she, it*, the said person or thing, the person or thing before mentioned or referred to; and so on in the plural. When this simple view of the subject is taken, no one can feel any mystery in the origin of pronouns. The first plan would undoubtedly be, to use the names themselves; and such is the first procedure in childhood; "Mamma loves Mary, and hopes Mary will be a good girl." Children use pronouns by degrees only; and those of the first and second persons much later than those of the third, for the obvious reason that these latter are the most convenient in their limited intercourse. The pronouns of the third person identify the object now spoken of, with that before spoken of, and save much circumlocution, and still more ambiguity; the pronouns of the first person are of great convenience, in cases where the name of the speaker or hearer is unknown, where there are others of the same name, and in the plural especially where several names must otherwise be often repeated.—The pronoun is then a very valuable, but not a necessary part of speech. How it might be formed, the very probable procedure in a few instances will sufficiently shew. Horne Tooke shews that *it*, formerly written *bit*, is the past participle of the verb  $\epsilon\beta\alpha\tau\alpha$ , *to name*, and therefore means the person or persons, thing or things named or *afforsaid*; and accordingly it was applied by all our old writers indifferently to plural and to singular nouns. We do not know whether a similar opinion as to the origin of pronouns had been previously laid before the public, but the philosophical Greek professor of Glasgow (who in his very interesting and important investigations, has often anticipated Horne Tooke) long ago delivered it as his opinion, that some, at least, of the pronouns, are participles, and, if we mistake not, traced the origin of *ego* and *ipse* as follows:  $\epsilon\gamma\omega$ , in one of its earlier forms, was  $\epsilon\gamma\omega\omega$ , which is an obvious abbreviation or corruption of  $\lambda\epsilon\gamma\omega\omega$ , so that *ego* (whence the Latin and other languages have their first pronoun) signifies the person speaking. *Ipse* is the Latin past participle from  $\epsilon\pi\omega$ ; and though this verb is not to be found in Latin writers, those who know how much the Latin is a dialect of the Greek, will not feel this to be a material difficulty: on this derivation *ipse* signifies the said person, &c. Whatever be the origin of *ille*, it is obvious that it is in itself merely an adnoun, (exactly corresponding to our *that*;) employed to point out, and probably accompanied in the first instance by the action of pointing out: now from this demonstrative adnoun, (a pronoun only by a subauditor,) the French have taken not only their demonstrative *le*, but also their legitimate pronoun *il*. *Ille* is never employed without a substantive expressed or understood; *il* will not admit of a substantive; and this fact, among many others which meet us at every step of our investigations, should prevent us from imagining that a procedure cannot have been, because we can now find no traces of it: the origin of *il* was an adnoun; it is itself a pronoun. We shall add one more example of the probable origin of pronouns. *Tu* is found in the form *tute*; *tute* is the vocative of *tuitus* or *tutus*, from *tuor*, *to see, to observe*, and signifies a *seen* person: we look at the person

we speak to, and, by direct inference, *tu* denotes the person *spoken to*. It may be objected that *tu* is from *tu*, a form of *tu*; it appears to us in no way unreasonable to suppose that the Latin has preserved a verb from the early Greek dialect which the common forms of the Greek have lost.

We do not think it necessary to enter any farther into the subject of the origin of oral language. It can scarcely be doubted, by those who have studied the nature of the other parts of speech, by means of the light which the researches of Horne Tooke and others have afforded, that all have been derived from the noun and the verb; and, admitting this, all that is incumbent upon those who profess to shew the original causes of language, is to present a probable origin of those classes of words. In those procedures which have been here stated, there is nothing which supposes metaphysical research, or much observation; and to render any procedure probable, it must wear the marks of simplicity. In the present period of the language, we see the grammarian pointing out the analogies which are found to exist in language, and thence proceeding to the formation of new words upon these analogies: this is art; but the early formers of language, in their inventions, followed only the dictates of circumstances; and whatever regularity we may perceive in their inventions, must be attributed to the similarity of those circumstances. We see the philosopher inventing a new term, agreeably to prevailing analogies, to express more power of the mind, or some emotion which had not received any denomination; but those who originally gave names to mental feelings, derived them simply from some analogy, fancied or real, between the internal and an external object, and those names which now suggest to us ideas the most subtle and refined, were originally only the names of objects obvious to the senses. The reasoner, when he uses a word whose meaning has not been accurately ascertained, defines the ideas which he intends to attach to it, and uses it accordingly; in the early and even in the more refined periods of language, the ideas connected with words have been the result of casual associations, produced by local circumstances, by the customs of the age, or the appearances of nature in particular situations.

In languages in which the coalescence between the verb and its adjuncts has taken place, and also the coalescence between nouns and their connective words, much greater liberty of inversion is practicable than in those in which such coalescence has not at all occurred, or but incompletely. In other words, where the noun, adnoun, and verb, admit of flexion, there the arrangement depends, in many instances, more upon the found than upon the sense; and nearly in all cases may be made subservient to the former. This gives such languages considerable advantage over those which admit of but few changes, so far as respects their modulation; and farther, the coalescence renders them much more forcible, where emphasis or any of the fractional parts is not required. Whenever flexion increases perspicuity, the advantage is decisive and obvious; with respect to modulation, though an object of some consequence (since we may sometimes find the way to the head and heart by pleasing the ear), yet all cultivated languages will be found to possess sufficient power of pleasing the native ear; and among those who made found to much an object, sense was often sacrificed to it; with respect to force it may fairly be doubted whether the advantage of greater precision by means of more accurate emphasis, does not counterbalance it. We are willing to admit, on the whole, that the advantage is somewhat in favour of those languages in which flexion is extensively adopted; but we can by no means admit the opinions of those, who think it necessary to a perfect lan-

guage. That language is not the most perfect, which enables us to express our thoughts in a great variety of ways, but that which enables us to express any thought with precision and perspicuity; and contemptible as our own uninflected language may appear to those, who can think nothing good, but what accords with the objects of their early taste, we are disposed to believe that in its real powers, it rises beyond all the ancient languages and most of the modern.

Before we leave the subject of oral language, we must pay some attention to the following inquiries; whether words are originally imitative; whether they were long; and of what kind of articulations they were composed. The latter are of importance in tracing the gradation from hieroglyphics to alphabetical writing.

Words in their present state are simply arbitrary marks, used to denote ideas, or combinations of other words; the found of some appears to be "an echo of the sense," but in the greater number of instances in which there is supposed to be this resemblance, very much may be attributed to the fancy of the observer. It is obvious, however, that there are some words which are formed upon found, and are truly imitative; such, for instance, as denote the various sounds of animals. When we carry our enquiries further back, we are led to suppose that this might be the case in the earlier stages of language; that the original words would be formed from some resemblance, real or imagined, between the found and the thing signified. What else, at first, could induce them to fix upon one found rather than another? We have already seen that sensible objects were the first which obtained names; and of sensible objects, the number is considerable which either emit some imitable sound, or perform such motions as have generally some connection with found. Of these latter the number is evidently small; waving and regular, rapid and slow motion, violent and smooth motion, appear to be all the varieties which found would denote. With respect to sounds, whether produced by animate or by the motion of inanimate objects, these might and probably would be imitated; and the names of those objects which were connected with the sounds would be derived from those imitative sounds. The Otaheitanians give to the gun the appellation of *tick-tick-bow*, evidently imitative of the cocking and report of the gun; and the Kamtschatkans denominated the Russian clergyman *bog-bog*, because he often repeated the found *bog*, which in the Russian language signifies God. With respect to qualities totally unconnected with found, particularly mental qualities, this principle of imitation is not directly applicable. We immediately see the incongruity of colour and found, when, for example, we call to mind the idea of the blind man, that a scarlet colour was very much like the found of a trumpet. A circumstance which appears to have misled several ingenious writers on this subject, is, that observing certain letters applied to denote a class of ideas which have, among others, some common features of resemblance, they have supposed that those letters were significant of that common feature; for example, that *c* denotes cavity or hollowness. Now supposing that there is that general idea, variously modified, in every word in which the *c* forms a principal part, does it follow from this that the *c* signified by its *found* cavity or hollowness? We can discover no such similarity. We apprehend that the coincidence may be better accounted for in a different way, that the original word denoting hollowness, which has entered, variously modified, into the words in question, was *c* with some vocal found. That is the extent of the inference which may be justly drawn from the coincidence; that it was so applied, but not that it was significant of the quality. We have been accustomed to use sounds in given connections with

with such regularity and consistency, that they appear to us to have a connection of real signification instead of merely arbitrary institution. Frequently, from our acquaintance with the sense, we read a combination of words as the sense dictates, and suppose that imitation in the words, which in reality exists only in our mode of enunciation; but it is only with words separately, considered from their connection with other words, that we are here concerned; and with respect to them we cannot but confine the resemblance of their sound to their sense, to cases in which they denote either sound, or motion, usually accompanied with sound.

In tracing the transition from hieroglyphics to alphabetical writing, the probability of the theory advanced will much depend upon the shortness of the words of that language in which the transition was made. It is generally supposed that this was the Egyptian; but of the ancient Egyptian we have no remains, excepting some words which the modern Egyptian or Coptic has preserved, many of which, however, are monosyllabic. It will be worth while, therefore, to state it as a general enquiry, whether the original words of original languages were long or short. Lord Monboddo supposes that all human sounds were originally inarticulate cries; and that the first articulate sounds were imitations of the cries of animals, and consequently were of great length. "For such cries of almost all animals have a certain tract and extension (as his lordship expresses himself) such as the lowing of an ox, the neighing of a horse, the braying of an ass, the roar of a lion, &c. And that we may not think them an exception to this rule, we need only attend to the dumb persons among us who utter inarticulate cries, sometimes very loud, but always of a considerable length." There are few looser reasoners than his lordship, at least among those who possess such a fund of information as his lordship certainly did. To adduce dumb persons as an example of what men possessed of the powers of articulation would do when they first began to use those powers, seems a very incorrect mode of argument. We must, however, remember that lord Monboddo supposes men to have arisen from the state of mere brutality. We suppose, and on far better authority than that on which he rests his faith, that man was never a brute, and that the first man was led by divine interposition to use his powers of articulation. We have already seen that it is probable that the sounds to denote objects emitting sounds, would be significant; and the cries of different animals would therefore furnish names for those animals. If we confine imitation to this, great length of words is unnecessary and improbable: unnecessary because one or two distinct articulations would generally be sufficient for distinction; thus, *bow-wow* would answer the purpose to denote a dog, as well as a continuation of the sound to a hundred syllables. It is improbable, because articulation is at first very difficult, and it is therefore scarcely supposable that more articulations would be used, than were necessary to express distinctly what object they were intended to denote. If we extend the principle of imitation further, and suppose that man imitated those cries in order to express his feelings merely, his cries would have no claim to the higher title of words, and at any rate would throw no light on our inquiries.

At first sight, the hypothesis that the original words of language were long, appears to draw considerable confirmation from the vocabularies of the North American Indians. Of three that are given us by Mackenzie, two appear to be composed of words, of from two to seven syllables; with scarcely any of one. The third, on the other hand, is composed solely of words of one or two syllables.

With respect to the former, even where words actually denote objects of sense, our inferences that they are uncompounded should be carefully drawn. The moon is expressed by two words, *Tilijca-pesim*, signifying the *night-sun*; and several others appear clearly to be circumlocutions. In like manner the savages on the river St. Laurence, near Montreal (who are Catholics) give the French priests the appellation of the *maître of life's man*; and it is by far the most probable supposition, that, in uncultivated nations, names of new objects would, when possible, be formed rather by significant combination of words in use, than by the formation of new words. Thus, as we learn from Mr. Park, the Mandingo nation use the following (among many) circumlocutions: *fruit is eree-cing, child of the trees; noon, teleekoniat, the sun over head; finger, boullakonding, child of the hand or arm; brother, ba-ding-kea, mother's male child; sister, ba-ding-moota, mother's female child.* Some others we have already noticed.

Lord Monboddo is very unfortunate in the choice of examples of his theory; for not one is of that class of names, which, in all probability, were the original ones, names of sensible objects. They are the following: *wonnanawuktuck-luit*, signifies *much*, and *mikkeuawukrook*, *little*, in the Esquimaux language; and *pollarrararocwacrae*, is the name for three among some South American Indians. With respect to the two former, the examples above adduced, authorize us to conclude that they are circumlocutions, descriptive of the signification. With respect to the last we may observe, that the names of numbers were, probably, originally significant in all languages; and that the length of those names would depend upon the length of the original words, and the manner adopted in combining them. Thus *six* is, by the Kamtschatskans, denoted by *innen-milchin*, i. e. *one and five*. Numbers are so familiar to us, and so distinctly arranged in groups, that perhaps in no instance are our ideas more clear. Yet this clearness entirely depends upon the distinctness of the signs we use to denote them. We speak of ten and twenty, &c. and all seems very clear; but it is evident that if we attempt to form a conception of ten, twenty, &c. we must pass over every one singly, and endeavour to combine them together by processes which will be varied by the habits of the individual. If we give a fresh name to every group of objects, and then consider those groups as units, and so on, we are capable of extending our ideas of number indefinitely, and of speaking and thinking of them with accuracy; but if the small extent of our intellect, or the circumlocutions of our situation, prevents this grouping, and we confine our attention to individuals, our arithmetic must be very confined. Those nations which reckon only by a computation with their fingers, carry their ideas of numbers no farther than ten; those who with the Kamtschatskans take in the toes, go as far as twenty; these people can reckon no farther, and when they have advanced to this limit, they say "where shall we go now?" It is difficult to conceive what circumstances could bound the arithmetic of lord Monboddo's Indians to three, or rather what should induce them to choose so troublesome a mode of procedure; but it appears probable that they joined the names of three different men or other animals; and if they had proceeded further, would have joined four together, &c. Why they did not use shorter words to form the combination, we cannot conjecture, unless it were that their tribe was originally very small, and that they mentioned the names of one, two, or three in order to denote those one, two, or three; and that these names, being proper names of persons, would be somewhat long. But this is entirely hypothetical. It seems a more

natural procedure to repeat the word as often as there were numbers to be denoted, but the ear would not readily follow this repetition.

If lord Monbodo had looked into the vocabulary of the Mexicans, he would have thought that his theory derived great confirmation from their words. Clavigero informs us, that they had words of fifteen or sixteen syllables; but he expressly says that they are compounds. He gives us one specimen of their mode of combination. It is a title of address, *Nelazomabuitztopiscatalzin*, and signifies *my very worthy father, or, revered priest*. It is compounded of five words (taking away eight consonants and four vowels), prefixing *no*, which corresponds to *my*, and adding *tzin*, which is a particle expressive of reverence; so that there are no fewer than seven words compounded together. Their language is very copious; and one cause of the length of their words is probably the deficiency of consonants, which would render a combination of sounds necessary for distinction. It is entirely destitute of the *b, d, f, g, r, s*, but abounds with *h, x, l, z, tl, tz*.

We have before remarked, that the importance of the enquiry to us results principally from its connection with the origin of alphabetical writing. Now we may admit that the languages of these North American Indians favours the hypothesis of long words without any injury, for among them alphabetical writing never existed; and we should have enlarged less on this point, if it had not led us to notice some curious procedures of language. Yet it seems reasonable to admit, as an inference, that the original, or rather secondary words of language, would have been long (though not to the degree lord Monbodo supposes), if the circumstances of man had not required a varied vocabulary; for the more confined the number of articulations, the more extent must be given to some words to distinguish them from others. But when we advance further, and inquire of what kind the original words of man really were, we shall see sufficient reason to conclude them to be short. Language was first used in the East, and there, too, writing was first invented. We have already mentioned, that of the ancient Egyptian words which are preserved in the Coptic, a considerable number are monosyllabic. The Chinese, which, as far as original language is considered, appears to have undergone little alteration, or combination, and is probably nearly an original language, is composed entirely of monosyllables. Probably, indeed, this was the very cause that the Chinese never advanced into the alphabetical mode of writing. They had no compounds of sounds; and they varied their words by inflection of voice instead of additions of articulation. The original words of the Hebrew, Greek, &c., that is, those which are not varied by the addition of other words, are short, frequently only of one syllable, seldom of more than two. And of the vocabularies which we have had an opportunity of consulting, of the uncivilized nations of the East, the words are generally monosyllabic or disyllabic.

Having now attended to the two former of the inquiries with which we proposed to finish the subject of oral language, we shall proceed to the last—Of what kind of articulations the early languages were composed. It appears that in the early languages consonant sounds were at least generally accompanied by vowel sounds; but though this is a material point in tracing the transition from hieroglyphic to alphabetical writing, it will not be necessary to enlarge much upon it. We think this position proved, by the following, in some measure unconnected, considerations. 1. Vowel sounds are by far the most easy; and consequently they constitute the earliest vocal sounds of children, and a large pro-

portion of the vocal sounds of uncivilized nations. Several words among the South Sea islanders are composed entirely of vowel sounds; and so great is the difficulty which these people find in pronouncing consonants together, that they called Sir Joseph Banks, *Opano*. From this consideration we may fairly infer, that vowel sounds would be frequent in the original words of the early languages, which were formed before articulation was become easy. 2. Yet as the shades of distinction between them, when employed alone or together, are too nice to furnish, at least to the unpractised ear, many obviously different words; and as man was not at first in that low state of intellect in which he has sometimes appeared, a vocabulary formed of such sounds would be very inadequate to his wants; and, therefore, we must suppose that in the early languages there would be very few words without consonant sounds. 3. Some of the first articulations of man were without doubt employed in naming those of the inferior animals with which he was concerned. Now their names would almost certainly be given from their distinguishing cries, and the cries of such animals consist of consonant sounds, each followed by a vowel sound. 4. Its articulation would at first be nearly as difficult as we now perceive it to be in children, the first words would be composed of simple articulations, that is, of consonant sounds, each followed by a vowel; and new words would be formed by the combination of such; so that in the early languages all compounds would be formed by the combination of simple articulations. 5. The greater part of consonant sounds, cannot be founded singly without vowels, nor together without vowels intervening. In many cases this is evident to the ear; and when it is not perceived, it often is the fact, though the acquired rapidity of utterance may render it very little perceptible. 6. Some languages do not admit of any two consonant sounds together. The Tartar language always requires a vowel between two consonants. The Russians, we believe, does the same. The Chinese never join two consonants, unless we must except *ng*; but this appears to be only a simple sound, though represented by two of our letters. With respect to the Chinese the point is of consequence, because there is great reason to believe that they came from the stock of the Egyptians, before there had been any considerable addition to their vocabulary by combinations of sounds, and before the transition had been made from hieroglyphical to alphabetical writing. It is true many of the Chinese words end in consonants, which seems to render improbable the position advanced; but it is to be observed, that in such cases the words should be considered as of two syllables; for it is impossible, in continued speaking, to utter a complete consonant sound at the end of a word, without emitting a vowel sound. 7. That the Hebrew (which is to be considered as a representative of all the cognate eastern languages) never founded a consonant without a vowel, may be inferred from this circumstance, that those who invented the denotements of vowel sounds, while at least the leading features of the pronunciation remained, thought it necessary to add or suppose understood a vowel sound after every consonant.

Having gone over the principal topics relative to oral language, we proceed to written language. Writing has been justly considered as one of the most noble and beneficial inventions which human ingenuity can boast. We shall not expatiate upon its advantages in embodying and perpetuating our thoughts, but shall proceed to give a history less enveloped in obscurity in most of its stages than that of oral language. Difficulties indeed attend it, as mult occur in every investigation into antiquity; but we have here data

which to found our conclusions, which the fleeting nature of oral language would not permit.

Visible language first used marks as the signs of things; and we can trace it through its various stages from the simple picture to the arbitrary mark. The rudest species of visible communication with which we are acquainted, is that of the Peruvians; it was by means of knotted cords of various colours. We have reason to believe, however, that this was not the only species of visible communication among them; and it was evidently very defective. The Quipos, as they are called, have been celebrated by authors fond of the marvellous, as if they had possessed regular annals of the empire; but it seems reasonable to hesitate here. They might have some significance by agreement, but without oral interpretation they could denote little more than that something was to be remembered, in the same manner as persons of weak memories sometimes adopt the contrivance of tying a piece of string round their finger to remind them that recollection is necessary. According to the opinion of the best informed judges, they seem to have been a device for rendering calculation more expeditious and accurate. By various colours, different objects were denoted, and by each knot a distinct number: so that they might serve as a kind of register of the number of inhabitants in each province, or of the quota they furnished to the general treasury of the nation. As they had picture-writing, though to no great extent, and numbers must be denoted by arbitrary signs to render calculation at all extensive, this account is by far more probable than that of those who suppose them designed for historical purposes. In this view they could answer no farther purpose than the twelve stones which Joshua set up after the passage of the Israelites over the Jordan.

The Mexican picture-writing was the first step in the progress towards alphabetical writing. The essential difference which it will be desirable to keep in mind between the latter and all the intermediate steps, is, that in alphabetical writing we use signs for sounds only; except with the deaf, they are in the first instance significant of things or ideas only by an intermediate step: picture-writing, in all its various stages, presents signs for things or ideas directly, and only for sounds as being the denotement of them.

The simplest species of picture-writing was that in which a mere delineation of the thing to be denoted was employed; thus, to express man or dog, &c. a drawing of the animal would be given. This we learn from sir William Johnson is the procedure of the North American Indians: when they go to war they paint some trees with the figures of warriors, often the exact number of the party, and if they go by water they delineate a canoe. When they gain a victory, they mark the handle of their tomahawks with human figures, to signify prisoners; and draw the bodies without heads to express the scalps they have taken. To these simple annals the warrior trusts for renown; and pleases himself with the belief, that by their means he shall receive praise from the warriors of other times. Thus, too, the Mexicans, when the Spanish invaders first arrived on their coasts, sent large paintings on cloth as expresses to their emperor Montezuma. But the Mexicans had made much greater advances than their savage countrymen; except in some few instances they did not indeed go further than simple delineation, but by a proper disposition of their figures they could exhibit a more complex series of events in historical order. They could describe, for instance, the occurrences of a king's reign from his accession to his death; the progress of an infant's education from its birth to the years of maturity; the different recompences and marks of distinction conferred upon war-

riors, in proportion to the exploits they had performed. Some very curious specimens of this picture-writing are preserved; the most valuable one has been published, and may be found in Purchas's Pilgrim. It is divided into three parts. The first contains a history of the Mexican empire under its ten monarchs; the second is a tribute roll, representing what each conquered town paid into the royal treasury; the third is a code of their institutions, domestic, political, and literary.

The defects of this mode of painting must have been early felt. It was, where applicable, a tedious operation; and no objects but those of sense could be denoted by it. The human intellect, stimulated by the necessity of improvement, would probably have gone through the same course in the new world as it had done in the old, and have proceeded from the picture to the simple hieroglyphic, then to allegorical symbols, and lastly, to arbitrary characters; but a step was early put to the progress of their improvement by the destruction of their most cultivated empires. In the simple hieroglyphic, a principal part or circumstance of the subject is made to stand for the whole; and to this the Mexicans had made approach. In the historical painting before mentioned, the conquered towns are uniformly denoted by the rude delineation of a house, to which is added some distinguishing emblem. The kings themselves, or the leaders of their armies, are in like manner denoted by heads of men with some emblematic mark conjoined. These emblematic marks were denotements, not of their qualities, but of their names, as we learn from Clavigero, who farther informs us, that the names of places were formerly significant compounds. They advanced still further, and made use of the mere figurative hieroglyphic. When they wished to express a monarch who had enlarged his dominion by force of arms, they placed the representation of a target, ornamented with darts between the figure of the king and that of the towns which he had subdued. To denote numbers, arbitrary signs were used. It will be seen from this account, that the Mexicans had actually in some instances passed through all the intermediate stages of writing, though the short duration of their empire prevented them from extending those rudiments to a regular system. Indeed Clavigero justly complains, that injustice is done his countrymen. They evidently made considerable use of the simple hieroglyphic; their marks for months and other portions of time, for the air, the earth, &c. were symbolical, and their cyphers were arbitrary; yet they are generally supposed to have made no advances beyond mere picture-writing. Their manner of denoting numerals was as follows. They painted as many points as there are units to twenty; this number had its proper character; then they doubled it, &c. for 20 times, that is, to 400, which had a new character; this they doubled, &c. in like manner, that is, to 8000, which again had a new character, and which they doubled, &c. as before. So that with these three characters, and the points, they expressed numbers as far at least as 20 times 8000, *i. e.* 160,000. At least, however, it must be acknowledged, that the annals of a nation, conveyed in the manner we have described, must be very scanty and imperfect. And accordingly Clavigero admits, that their paintings ought not to be considered as a regular full history, but only as monuments and aids of tradition. The parents and masters took the greatest pains to instruct the rising generation in the history of the nation. They made them learn speeches and discourses which they could not express by the pencil; they put the events of their ancestors into verse, and taught them to sing them. This tradition dispelled the doubt and ambiguity which painting alone would have occasioned; and by the assistance of these

monuments perpetuated the memory of their heroes, their mythology, their laws, and their customs. See Robertson's *America*, vol. iii. p. 173—180, and Clavigero, vol. i. p. 409—11.

This simple picture-writing would soon be contracted by necessity; parts of the object, or the principal circumstances of the action, would be delineated to denote the whole of the object or action which it was intended to represent. This would correspond to what we should call in writing a plain style; but it is obvious, that language, whether written or spoken, if confined to words denoting objects of sense merely, would be very meagre and imperfect. To enlarge the powers of visible communication, the real or supposed instrument of a thing was placed for the thing itself. And a still more refined species of hieroglyphic is, where qualities, &c. were represented by objects which had some real or supposed analogy to them; this corresponds to a figurative style. We here speak of hieroglyphics as intended for the purpose of communicating, not concealing knowledge. It was long supposed that the latter was their first and only purpose; but bishop Warburton has satisfactorily proved that this use was not made of them after the former was rendered unnecessary by the invention of alphabetical writing. It is for the purpose of communication that we wish to consider them. Warburton seems to consider these three kinds of hieroglyphics as in reality three distinct species of communication; but as De Guignes justly observes, this difference regards the style alone. And though probably the most simple hieroglyphics were those first used, yet as language must have made some progress by the use of permanent visible communication, it was found necessary, and consequently must have given metaphorical meanings to the names of many sensible objects, it is not to be supposed that the hieroglyphics would be confined thus even in their very earliest stages. We must remember, too, that even the rudest kind is an improvement upon the picture-writing; so that we are not to consider them as the first attempts of men to embody their thoughts.

The most simple species of hieroglyphics was when the delineation of part of the object or action represented the whole; thus the ancient Egyptians painted a man's two feet in water to represent a fuller; smoke ascending, to denote fire; two hands, one of which held a buckler, the other a bow, to denote a battle, &c. Now if we direct our attention to oral language, we shall perceive that it still retains many of these contractions, particularly in poetry. The sail, for instance, to denote the whole ship; the hand, to denote the whole man, &c.; where, however, it must be remarked, that these contractions are for the purpose of denoting the part of the object, &c. which is most to be attended to in the given circumstances, and therefore come under the second kind of hieroglyphics, where the real or supposed instrument is used to denote the performer or the thing performed. And indeed so long as oral language denotes sensible objects, there is no advantage with respect to brevity in placing the name of a part to denote the whole, since, except in peculiar cases, the name of the whole may be pronounced with as great facility as of the part. Examples of this second class of hieroglyphics, are the eye and the sceptre to denote a king; a sword to denote a bloody tyrant; the mouth for speech and voice; an eye placed in an eminent position, to denote the presence of God; and the sun and moon in like manner were used to denote the succession of time. Instances of similar metaphors in common language are very numerous; to take the last two instances, we say the eye of God is upon us, meaning that the omniscience of the Supreme Being extends to us; and though perhaps it would be too bold even for our poetry to use the expression

of fun for the time of his apparent revolution; yet we might employ moon to denote the time of a lunation. The last kind we mentioned, was that which employed, to represent one thing, another which had some resemblance or analogy to it. Hence was the last professed in the invention of oral as well as pictured language, and it is perfectly similar to what at present we consider as an ornament, figurative language. For it must be observed, that what we consider as a beauty, was originally the invention of necessity. For instance, among the Egyptians the dog's head, (as among the Chinese the dog's voice,) was the symbol for sorrow; science was denoted by dew falling from heaven. This very metaphor is expressed in the form of a simile, in Deut. xxxii. 2. "My doctrine shall drop as the rain, my speech shall distil as the dew, as the small rain upon the tender herb, as the showers on the grass." These symbolical hieroglyphics would be very frequently derived from very fanciful analogies, founded frequently on the popular prejudices of the times. As an instance, may be mentioned the figure of an hyæna, which was used to denote a man who supported his misfortunes with courage, and rose superior to them. This took its rise in the opinion that the skin of the hyæna rendered the wearer fearless and invincible. The last we shall mention, is the famous inscription at the temple of Minerva at Sais, where we find the figures of an infant, an old man, a hawk, a fish, and a river horse. The hawk and fish were one character; this kind destroys fish, and is therefore the symbol for hatred. The river horse was the symbol for impudence, and the infant and the old man were intended to denote all men. The hieroglyphic therefore means "young and old hate impudence;" or, more literally, "old man, infant, hatred, impudence." It has been more diffusely rendered; "all ye who enter into the world, and who go out of it, know that the gods hate impudence." We may remark, as we proceed, that this tends to confirm the hypothesis, that originally all words, even verbs, were nouns. This hieroglyphic was a plain admonition, designed for the instruction of the people; for it was engraved on the vestibule of a public temple; and is therefore justly considered by Warburton, as one proof that the original hieroglyphics were for the purpose of communication, not of concealment. If the Scythian king had been able to delineate objects, he would perhaps have lent as painting to Darius instead of the real objects. The picture of a mouse, a frog, a bird, a dart, and a plough would have answered the same purpose as the things themselves, and have been less inconvenient. They would then have been real hieroglyphics.

The first object of those who invented hieroglyphics, was to preserve the memory of events, and to make known laws and regulations for the conduct of the citizen and the man. Such symbols therefore would first be employed as were of obvious interpretations. Figures founded on their language (which, as we have already observed, must have made considerable advances towards improvement,) would be readily understood, even if the analogies which gave birth to the words were forgotten. By degrees they were employed for the more refined purposes of philosophy; and analogies and resemblances were the foundation of hieroglyphics, which would be intelligible only to those who were acquainted with the sciences from which those analogies were deduced. This progress, as we shall afterwards see, is the same with that of the Chinese language, which in all its stages is an object worthy of our curiosity. Still, however, there was nothing done for concealment. The purpose of communication was still kept in view, and knowledge of the theories of the times alone was sufficient for their interpretation. But, by degrees superstition appropriated them for the purpose of concealment,

concealment, and those whose dominion over the vulgar consisted in the possession of mysteries, after the invention of alphabetical writing, which would otherwise have annihilated the use of hieroglyphics, still employ'd them to keep the secrets of the priesthood from the eyes of the profane vulgar. Their symbols, which for the purposes of communication should have had an obvious analogy, were introduced from far-fetched resemblances. A cat was used to denote the moon, because they perceived a difference in the size of its pupil at the full moon, and in different periods of its apparent magnitude. Egypt (which in the common hieroglyphic was denoted by a crocodile,) was in the sacred hieroglyphic denoted by a burning censer with a heart upon it. In the natural progress of hieroglyphics, qualities would be denoted by the objects which would be considered as possessing them in a great degree; as we have seen in the inscription at Sais. But to make the hieroglyphic a real mystery, one animal or sensible object was made to denote a variety of contrary qualities; thus the hawk denoted sublimity, humility, victory, excellence, &c. And on the other hand, the same idea was denoted by various hieroglyphics. It was this use, which was probably posterior to the invention of alphabetical writing, that has attached to the hieroglyphical system the character of mystery.

It is obvious that the exact manner of delineation would be tedious, as well as voluminous. The more use was made of visible communication, the more we may expect to find the written characters depart from the simple picture, and become arbitrary marks. Not, indeed, arbitrary in their original invention, but perfectly arbitrary to those who afterwards used them. We see, from the remains of the Egyptian hieroglyphics in their early stages, that they paid considerable attention to the delineation of their figures: they filled up the outline of their pictures; in process of time they used only the outline; and these, again, they changed, as the convenience of the writer dictated, till at last it lost every resemblance to the object which it originally represented. The changes that our written characters have undergone, and are continually undergoing, might be adduced as an exemplification of this procedure, from delineation to the curvish hieroglyphic. The mark for *and*, for example, was originally significant; it did not, indeed, represent an object, but it was a correct picture of a word. Some of the forms yet shew its derivation; & is obviously *et*; but continual changes have been made upon it, till the & of the writer no longer bears marks of its origin. We cease now to consider the letters of which it is composed; it is the representative of an idea, and, consequently, of the word denoting it in the respective nations that use it. We use it for *and* without considering at all the meaning it originally had. The use of the curvish hieroglyphics would, in like manner, take off the attention from the symbol, and fix it upon the thing signified; a progress which we equally observe in oral language, where the words employed to denote mental affections were originally denotements of sensible objects; then of mental affections bearing some resemblance to them; and, lastly in many instances, of those mental objects, without any reference to the original meaning.

We have now advanced to the verge of alphabetical writing. So far has generally been regarded as simple, and as the actual procedure; but it is imagined that still there is a great gulf, whose depth is unfathomable. Many of the preceding observations have been made with a view to this discussion; and by their means it does not appear difficult to ascertain the exact procedure. Perhaps we shall not be able to trace all the minute steps of the mind's march; but the general tract we shall find no difficulty in pursuing.

Truth, Horne Tooke observes, has generally been supposed to be at the bottom of a well; he thinks it lies much nearer the surface. More has been supposed necessary than could have been done, at least than is probable, at the periods of which we speak; and this has deterred those who saw the necessity of simplicity from attempting any thing. We shall see that much was not necessary; certainly not so much as to render requisite the exertions of genius, aided by the light of philosophical research. Signs, we have seen, become at last arbitrary marks for ideas or words. From this stage we may consider written language as taking two different courses; in one the sign became merely the sign of the *sound*, and its combinations the signs of those of sound; in the other the sign was considered as the sign of the *idea*, and its combinations did not correspond with any combinations in oral language, but were representative of combinations of ideas. The former we may expect to occur where oral language was copious, the latter where it was scanty; the former where learning was considerably diffused, the latter where it was confined to a small proportion of the persons using the language. Where the visible signs became merely signs for sounds, alphabetical writing, as we shall hereafter see, easily followed; where they were arbitrary signs for ideas, every new combination not attended by a correspondent combination in oral language, placed the introduction of alphabetical writing at a greater distance than ever. This latter we shall find to be the case with the Chinese language, to which, as far as respects the objects of the present discussion, we wish now to call the attention of our readers; as presenting some most important features in the history of language.

We have seen that written language originally consisted of pictures of the things to be denoted; then of abbreviated forms of the same; that these pictures and abbreviations were employed to denote, not only the objects they represented, but others which had some real or supposed resemblance to them; and finally, that through gradual changes and abbreviations of the written character, it became at last, instead of a picture, a mere arbitrary character. Through all these stages has the written language of China passed: from causes, some of which we can trace, they here stopped. Other nations proceeded further, and used these marks as the signs of sounds and of ideas through their intervention; the Chinese employ them as the signs of ideas, without the intervention of sounds, and their combinations and changes have no corresponding combinations and changes in their spoken language.

Before the time of Fohi, the first Chinese emperor, the Chinese used knotted cords, similar to those of the Peruvians. Fohi, in the place of these knots, employed two horizontal lines, the one whole, the other divided, and by their various combinations in threes, formed the text of the most ancient work among the Chinese, known under the name of Ye King, or the book of production. The Chinese regard this work as a precious monument of the most ancient philosophy; but, notwithstanding the numerous commentaries which have been published upon it, some so early as 1100 years before Christ, it is still unintelligible. They are, however, supposed to contain, in a few lines, the most sublime truths, and are still employed for the purposes of divination. Subsequent to the trigrams of Fohi, Xin-nang, the next in succession, is said to have invented sixty-four hexagrams, which are supposed to express the whole circle of human knowledge, and, together with the trigrams, are to be considered as the most ancient written characters of the Chinese. It is supposed that these characters were taken from the knotted cords; and it appears

to us highly probable that they expressed no more. It does not appear at all likely that these marks should be intended to denote the mysteries of philosophy, whether we consider the time of their invention, which is carried back to the age of Noah, or their inadequacy to express any thing but numbers. It is allowed that the earliest writing of the Chinese was the result of the rotation of numbers by the knotted cords. In fact, the present numerals of the Chinese appear to have an equal right to be considered as the mysterious denotements of mysteries. The present Chinese characters are not to be deduced from these combinations of lines, but from pictures and symbols. Their present form does not present any objection to this supposition. Many of them, indeed most of them, bear little or no resemblance to their original form; but the progress can be traced in very many cases, and hence it is a fair inference that they were deduced from pictures and symbols, even where the connecting steps are lost. Several examples of this are given in the Philosophical Transactions for 1769, vol. lix.

Before we proceed further in the consideration of the written character of the Chinese, we shall find it expedient briefly to consider the singular structure of their oral language. This, as we have before observed, is entirely monosyllabic; and every word may be expressed by an European consonant and a vowel, and about one-third of the words end with *n*, or the nasal sound of *n*. We must not expect to find a monosyllabic language very copious in sounds; and we shall expect a still smaller variety of words when we find that their consonant sounds are less numerous than ours, as they are destitute of the *h*, *d*, *r*, and *x*; in fact, the number of their words is not more than 330. This number is so small, that we should suppose it inadequate to the purposes of life, much more so to those of science. The capabilities of their oral language are, however, very much increased by the variation their words undergo by means of tones, or other inflections of the voice. For instance, the word *Fu*, differently pronounced, denotes a husband, to help, a town, a father, and to conceal. There are other modifications of sound which the same word undergoes, which enables them to extend its meaning without confusion, and this to things very opposite, or at least very different in their nature. These nice distinctions certainly require a very discriminating eye to perceive them, and very flexible organs to express them; but we know the power of habit.

We have in our own language instances of words approaching so nearly to sound, that many never pronounce them correctly, yet seldom leave any room for ambiguity; for instance, *hair*, *air*, *heir*, *are*, *hare*, are all different sounds, but their similarity is so great, that many confound them in pronunciation. Staunton observes, that synonymous words are very much used in conversation; and this must materially lessen the ambiguity. This, however, must be only for the sake of those who have any difficulty; for it seems to be the genius of the Chinese language to express the ideas of the speaker in as few words as possible. "The Chinese," says a writer in the Philosophical Transactions, vol. lix, p. 495. "speak as fast as we do, say more things in fewer words, and understand each other." The last resort to diminish the occasional difficulty in conveying their ideas by oral language is to trace the written sign in the air, or in a more permanent manner.

A language in which we find not more than 1500 distinct sounds cannot be considered as copious. It is probably sufficient for all the purposes of life, but for the purposes of science very inadequate. Most nations have improved their oral language; the Chinese have directed all their attention to the improvement of their written language.

They have refrained from combinations of words to express combinations of ideas; and what appears still more singular, the combinations which have been formed in their visible, have not been carried into their oral language. In fact, the Chinese writing may be considered as totally distinct from their oral language. One might have supposed, as Ferret says, that it was invented for those who do not possess the capacity of speech. The written not having been founded on the spoken language, the improvements and changes of each are independent of the other. Their characters were originally signs of ideas; and as it is much more easy to introduce changes in the language of science, than of the vulgar, the philosophers combined, and combined their combinations of characters, but did not, perhaps could not, carry their combinations into oral language. Thus, for instance, the character for *house* named *mien*, and that for *fire* named *ho*, when combined denote *calamity*, expressed in oral language not by *mien-ho*, but by *tsai*. On the other hand, as our writing is a denotement of sound, every combination of written words will have a correspondent combination of sound: and no combinations will be formed except such as can be spoken. We may compare the Chinese characters to the arithmetical cypher, or to algebraic or astronomical characters, which may be understood by those who are unacquainted with the words we express to denote them. Present an arithmetical calculation, or algebraic demonstration, to ten mathematicians of ten different countries, every one understands it immediately. In the same manner the Chinese characters are intelligible not only in all the provinces of this vast empire, but farther in Japan and Cochinchina, whose spoken languages are totally different from that of the Chinese. If these nations converse they employ an interpreter, but the obstacles to communication vanish, as soon as they trace their written character. There appears, however, a considerable difference between the common use of the arithmetical cypher, and the use of the Chinese philosophers make of their characters. We always think of *one*, *two*, &c. if we use 1, 2, &c.; at least this must be the case with all who are not in the habit of calculation; and the visible sign is so strongly associated with the audible, that we apprehend few persons read to themselves without the intervention of sound, real or conceived. When we think in words (as we always do when we reason, and frequently when we feel), it is to the audible and not to the visible sign that we attend: and we apprehend that it is generally the case where the habit of solitary study and seclusion from the world has not been formed. Our written words are more or less exact representatives of the sound, and it is therefore difficult to separate them even in imagination: but the Chinese characters have no connection with sound, except by their common connection with ideas. And as they have no visible representation of the sound, its intermediate association cannot be sufficiently strong in the minds of their literati to render it necessary in the train of reasoning to use the sound at all.

All the Chinese characters are composed of 214 *keys*, *keys*, or *tribunals* (as the Chinese themselves call them). These represent the most simple ideas, and by their combinations are produced, expressions for the more complex ideas. In fact, these keys express *fire*, *water*, *earth*, *air*, *wood* (which are the five elements of the Chinese), *the sun*, *the moon*, *bird*, *man*, different kinds of *animals*, *mountains*, *valleys*, &c. *father*, *mother*, *son*, *life*, *death*, *the body*, and different *parts of it*, and some *vessels* and *instruments*, and many other things similarly simple. All these can be traced to simple paintings or symbols; and hence the whole written language may be justly considered as deducible from the

## LANGUAGE.

more simple writing of the Mexicans and the Egyptians. Indeed, the resemblance between the ancient Chinese character and the Egyptian hieroglyphics is so striking, and this in cases where the analogy on which both are founded is not an obvious one, that De Guignes considers them as derived from the same source. The actual number of the keys at present is 214; and anciently they were more or less numerous, but this has been owing rather to the different opinions of the philologists of the time, than to any real change in their number. These keys are formed at present from six simple strokes, a horizontal line, two perpendicular lines, the one pointed at the bottom, the other blunt, a point, a line curved to the right, and another to the left. We are not, however, to suppose, that the inventors of the Chinese characters fixed upon these six elements, and composed all the characters from them methodically: this is the procedure of art. But as writing gradually passed from painting, it lost its correctness of delineation, and then the object was to facilitate, as much as possible, the labour of writing. It reduced all the characters by degrees; the more compounded, to others less so; and these again to simple strokes, such as have been mentioned. These 214 keys are each employed alone, as a character serving to express an idea, or differently combined one with another when they are considered only as parts of a group. The several parts of this group, or combination, form a kind of phrase expressive of the idea it is intended to communicate. Thus, the Chinese character for *night*, is composed of three characters, signifying *darkness*, the *action of covering*, and *man*, which rendered literally, signifies *darkness covering man*; a phrase which perfectly expresses the idea of night, and which is similar to the language of poetry. Both, in fact, issue from "the cradle of the human race." This figurative kind of language (the offspring of necessity) is what we admire so much in the sacred writings; it comes home to our feelings and our bosom; it points to our minds, and calls up their conception forcibly and correctly. Hence it is justly deemed a beauty, and whenever the language of feeling is necessary to excite the mind to activity, will generally be found a prevailing trait.

We might suppose that all the Chinese characters, being composed of simple characters, might be easily understood, when the meaning of the keys composing them is known; as is the case in the two examples which have been given. If it were actually so, the Chinese would be the most easy of all languages, and might be adopted as a general or philosophical language; but the analogies and metaphors on which the composition is founded, are often forced and often erroneous. Their principles of philosophy furnished a wide field for combination; but frequently these are absolutely false: their ancient customs and their popular superstitions all afforded scope for the invention of new characters; and to understand the compound characters of the Chinese, without the aid of oral instruction, we must understand their ancient physical and religious dogmata, and join to this an acquaintance with the fleeting customs and opinions of the times in which they were formed. This is not peculiar to the Chinese language; in order to trace the origin of words, the same references are often necessary, but we have more frequently the data requisite to enter into them. For instance, *candidus* in Latin signifies *white*, *candidatus*, a *candidate* (a person who offers himself to fill a lucrative or honourable situation), a *person dressed in white*. We should have been unable to follow this analogy if we had not been informed by history, that among the Romans all *candidates* for places wore white robes. In a similar manner the Chinese character, *two*, *rua*, is composed of two, that of

*wrapping*, and that of *feet*; this is not an obvious procedure, and the Chinese do not retain any explanation of it; but we know that the savages of Louisiana, when about to undertake a long march, *wrap* up their *feet* in cloth to prevent their being torn; and it is highly probable that the combination of *two* must refer to a similar custom.

We have now traced the various procedures which have been adopted to perpetuate the remembrance of actions or opinions. We have seen the artless contrivances of men in early stages of cultivation; we have observed the progress of the art of visible communication from the rude *quipos* of the Peruvians to the curvilinear hieroglyphic of the philosophic Egyptians. We have found that when the visible marks lost their original correctness of delineation, they became mere arbitrary characters. From this stage two procedures have been pursued; some nations have ceased to consider them as signs for things, and have retained them as signs for sounds; others have continued to use them as signs for things without any immediate connection with sound. The latter have combined, and combined these combinations to form expressions for ideas without any regard to analogous combinations of sound; the former have combined them to express combinations of sound, and of ideas only by their intervention. In the one the written language is a picture of the spoken, in the other it is a picture of thought. We now proceed to the object we have all along had in view—the investigation of the other procedure, where visible marks became signs for elementary sounds.

In tracing the origin of oral language, we derive some assistance from the Mosaic records; we ascertain the degree of divine interference. In tracing the origin of alphabetical writing we must expect no such assistance; the art of writing is no where referred to a divine original, and while revelation is thus silent it becomes us to be silent too. Upon the principle that we ought not to suppose miraculous interposition merely from the difficulty of accounting for a phenomenon, we should argue *a priori*, that no miraculous interposition took place in the present instance. This would not weigh in the least if we were assured by the scriptures of the reality of that interposition; but it weighs very much against all presumptive arguments for it. However, though revelation is silent on this head, yet there are some arguments in favour of the theory of the divine origin of alphabetical writing, which it will be desirable to consider. After stating these and the answers which occur to obviate or lessen the difficulties they present, we shall point out what appears the most probable account of the transition of hieroglyphics to letters.

It. Alphabetical writing may be traced to one source. Now if it were an invention of man, especially if it be a simple invention (as it must be shewn to have been, in order to give any plausibility to the hypothesis), there is no reason why it should not have been an independent invention.

Two answers may be given to this argument. 1. If we examine the alphabets of Asia, we shall find it difficult to admit that they may be traced to one source; there is so great a degree of dissimilarity among them, that it requires stronger evidence than any we have yet seen to prove it. When, however, we consider the changes that we know have actually taken place in the same character, we may admit the possibility of the original identity, and perhaps other circumstances may induce us to admit its probability; but this probability cannot, we apprehend, become so great as to give any force to the argument in question. But even admitting its certainty, we observe, (2) that this can only prove the high antiquity of the invention. That it originated before mankind were much separated from each other;

other; and that the ground-work being laid by those who had made the greatest advances in cultivation, was built upon by those people who afterwards penetrated to a distant part of the continent.

But it is urged, in the *second* place, that we have not only no instance of independent discovery, but have even an example of a nation, which had no communication with the original inventors, remaining in total ignorance of it, and employing a procedure which now incapacitates them for the reception of alphabetical writing; and the force of this objection is materially increased by the circumstance, that their writing, equally with the alphabetical, originated in hieroglyphics, and actually went through the same stages, viz. from the simple picture to the arbitrary mark.

This singular procedure of the Chinese, which certainly presents a difficulty against the theory of the human origin of alphabetical writing, may probably be obviated by the four following considerations: (1) The written language of China was cultivated more for the purposes of philosophy than of common life. Their combinations were founded on their philosophy; and it probably would not have been in their power to have carried these combinations into the oral language of the vulgar. A complete nomenclature of chemistry has been introduced, founded on the prevailing theory of chemistry. This is universally received, wherever the new system is embraced; but it would have been impossible for the philosophers, who invented this beautiful specimen of philosophical language, to have induced the illiterate of a whole nation to change their language, or adopt a new one, however expressive and correct. The philosophers of China might indeed have formed an oral language upon their characters; but the genius of the Chinese seems rather to direct them to study than to conversation, and abstract philosophy is better taught to the studious by written than by oral communication. Besides, (2) the spoken language of China did not favour the plan of making their writing representatives of sound; for their words being all monosyllabic, and not very numerous, there would not be the same necessity for attention to elementary sounds: and what is more important, they did not vary the *articulation*, but the *tone*, in order to express a variation of meaning. It appears to us, that alphabetical writing could not, from the very nature of their spoken language, have originated among the Chinese: and to these considerations we may add, (3) that the empire of China, with its dependencies, was so extensive, that there must be a very great variety in the Chinese dialects; and this would contribute to increase the attention of their literati to the written language, since this (as we have seen it actually is) might be understood independently of their spoken words. (4) If we admit the very probable hypothesis of De Guignes, that the Chinese characters were brought from Egypt, and that they had originally no connection whatever with the spoken language of the country into which they were introduced,—that, in fact, they were applied to denote names different from those with which they had before been connected,—we shall perceive at once the reason why, originally, the combinations of the characters were not attended with similar combinations of sound. After this, there is no difficulty in admitting that the written must continue independent of the spoken language, especially among people so little addicted to innovation as the Chinese appear to be.

It is urged, in the *third* place, that the invention of writing is, by many of the ancients, ascribed to the gods; and that Pliny, in particular, expressly says that the use of letters was eternal.

To this it is replied, that the ancients universally ascribed

to the gods all inventions of which they knew not the origin; and that as for Pliny, he expressly says elsewhere, that the Phœnicians were famed for the invention of letters. The merit that this argument can prove is the antiquity, but not the divine origin, of this invention.

Such appear to be the principal arguments from fact, in favour of the divine origin of alphabetical writing. There are some arguments *à priori*, which remain to be considered: these are, *first*, the difficulty of the invention in any stage of human progress; and, *secondly*, its antiquity, which very much increases the improbability of its human origin.

*First*, With respect to the difficulty of the invention, it is observed, that we are to suppose that the inventors decomposed the sounds of words, not only into syllables, but into letters; observing the component parts of syllables, and denoting these parts by appropriate marks; and using marks for these elementary sounds in the visible representation of other words, into which those sounds were found to enter. This distinction of the articulate sounds of man, tracing them through all their various combinations, and expressing them by a few simple marks, whose combinations may express every possible combination of sound, appears to suppose a habit of patient experiment, of discriminating examination, and of generalization, which ill accords with the uncultivated state of the human intellect in the early periods of society. But, *secondly*, when we consider the antiquity of the invention, when we are forced to carry it so far back as to have been in a state of perfection as early as the time of Moses, this difficulty appears insuperable. We must admit, it is urged, that men, in the earliest ages, stepped at once from a tedious and awkward, frequently unintelligible, method of communication, to a method which answers every purpose of communication, in the shortest way; and that, unlike all other inventions, it was brought at once to such a state of perfection, that no succeeding alphabet has any real superiority over the ancient Hebrew.

This objection against the human origin of letters is more weighty in appearance than in reality. With respect to the difficulty of the invention, the objection loses all its force, as soon as a simple and easy procedure, such as might be adopted in the circumstances of the case, can be pointed out. To obviate the difficulty arising from the *apparent perfection* of the original invention, we may observe, (1) that if the perfection of an alphabet consists in its capability of expressing all the sounds of spoken language, there is no known alphabet which is perfect. Every letter should express only one definite sound, and every known sound should have a corresponding letter. We do not mean that it is necessary that the alphabet of one language should be capable of expressing all the sounds of another, but of its own. Now we have no instance of this among living languages; and we cannot, therefore, suppose that it was the case in any former language. But even admitting this, we may observe, (2) that no known alphabet, however ancient, is in the state of its original invention. Cadmus, who was born in the East, carried with him into Greece only sixteen letters; the least curious alphabets we are acquainted with have twenty-two. It is not in the least probable that Cadmus would introduce fewer than he possessed: it is more probable that he introduced more, to express sounds of which he had no representation, but which were found among the Aborigines of Greece.

We have said, that if a procedure can be pointed out, simple as the intellect of the inventors of language, and capable of easy introduction in the early periods of mental culture, all arguments *à priori* fall to the ground. It has generally been supposed of late that alphabetical writing was  
formed

formed from hieroglyphics: it appears nearly certain that it was so; but the transition was never, we apprehend, explained with probability before the time of De Guignes. His hypothesis appears to have been unobserved by subsequent writers, who have attempted to trace the transition; and the only satisfactory statement which we have noticed in our own language is in a paper in the Irish Philosophical Transactions, by Dr. Hearney, who advances one important step, by supposing that letters originally represented syllables. Dr. Hearney, however, speaks of the human mind as accustomed to analysis, when the transition took place; and supports his hypothesis on the subject with arguments which appear little conclusive.

"Perhaps," says De Guignes, "we have done too much honour to the inventor of letters (whoever he was), in supposing that he dissected the voice into two parts, and invented marks of two kinds, some to express consonants, the others vowels. It is more natural to suppose that the hieroglyphical writing was abridged by little and little, by suppressing a great number of figures; and that those which they adopted preserved always the sounds which they had before; that they read them as they had read hieroglyphics; that they were always words, but very simple, and words whose base was a single consonant; that finally reduced into a regular order, (which we call the alphabetical,) they were regarded as consonants, capable of being differently modified by a simple vowel found."

Our ideas on the transition from hieroglyphics to letters, (derived in a great degree from De Guignes,) may be thus stated:—The hieroglyphics, with their exactness of delineation, lost their original significance, independent of spoken language. This must first be the case with words of the most frequent recurrence, and which entered most into combination with other words. Having become simple denotements of sound, they were employed to express their respective sounds in combination of other monosyllabic words, which in like manner had lost their original significance. Hence, by degrees, they would become representative of the component parts of all words into which their respective sounds entered. They were always words, but very simple, consisting only of a consonant and a vowel. Variation in the pronunciation of the vowel would occur in different dialects; and hence these marks would gradually be regarded as consonants, capable of being differently modified by simple vocal sounds. Letters, at first monosyllabic words, then became marks for the component parts, or syllables of dissyllabic or polysyllabic words; and then for the unchangeable part of those syllables, that is, for consonants. In the most ancient state of the oriental languages, vowel sounds had no distinct marks; in the latter, marks were joined to the consonants, to express the different sounds with which the radical consonant was invested. Among the western nations, a different procedure was adopted. In some cases, they used the marks which they had received from the oriental nations, for an *aspirate and vowel*, to denote the *vowel itself*; and having once commenced the use of distinct marks for vowels, the procedure was continued, and new marks adapted to express noticed variations of vocal sounds.

In support of this hypothesis, may be adduced the following observations:

1st. We have seen that hieroglyphics did become significant of *sounds*; and that words originally significant of one class of ideas being applied to a second, lost their connection with the former, and became directly significant of the latter.

2. We have reason to believe that words were originally

monosyllabic in those nations where alphabetical writing was invented, and that the combination of old sounds, or the use of them uncombined, to express new ideas, was the mode employed to extend the capabilities of their language. Hence the same word would frequently occur in combination, and though its different significations must originally have been represented by different hieroglyphics, yet as these lost their significance, they would easily become as extensive in their meaning as the sounds themselves. And it is obvious that the most simple of those hieroglyphics which were used for the same found, would be employed to represent the found.

3. It has been shewn to be highly probable that originally every consonant had its vowel found. Hence all syllables might be represented by two, or at most, three European letters. This circumstance would materially diminish the varieties of syllabic sounds.

4. The probability of the theory advanced depends greatly upon the hypothesis that originally letters were syllabic. The following facts appear to prove this. The ancient oriental alphabets had no denotements for vowels; and even if this be disputed, it must be admitted that they had many words into which none of the supposed vowel marks entered. The Ethiopian alphabet is entirely syllabic. The simple letters denote a consonant and a short *a*, and marks were added to them to denote other vowels, where used. What is doubly singular and important, they have in many cases added marks to these syllabic characters, to denote that they have no vowel belonging to them. In the Coptic and Arabic, there are syllabic characters. The alphabets of the eastern Asiatics are principally syllabic, some with *z*, others with *z* joined to a consonant. These circumstances render very probable the account here given of the transition from hieroglyphics to letters. The following observations more directly tend to ascertain its high probability.

5. The letters of some of the ancient alphabets have so great a resemblance to the hieroglyphical characters, indeed are such exact transcripts of them, that a simple inspection is sufficient to convince us that hieroglyphics were the origin of letters, and this point is almost universally admitted. This however proves little as to the nature of the invention of alphabetical writing, except that it was subsequent to the use of hieroglyphics. But,

6. These characters in many instances retained their original significance, which proves them to have been, as De Guignes supposes, denotements for words. We must not expect to find this significance in all words of which they form component parts; but in such only in whose visible representation the original hieroglyphic formed a component part. Now we must observe, first, that the names of several of the oriental letters are still by themselves significant, and that some of these letters are similar to the Chinese characters which have the same signification. Thus the Hebrew *yod*, signifies the *hand*. Its form in some alphabets resembles the Chinese character for *hand*. The *7*, *daleb*, of the Hebrews, Phœnicians, and Ethiopians, signifies a *gate*, and the *action of opening*. The hieroglyphic which among the ancient Chinese represented a *gate*, is exactly similar to this letter. The *2*, *phi*, of the Hebrews, and of the Ethiopians, signifies the *mouth*. The Chinese characters for the mouth all resemble it. The *3*, *ain*, signifies the *eye*. The Phœnicians and Chinese employed the outline of the eye as a denotement of the object. The *4*, *sin*, in Hebrew signifies the *teeth*, and its figure is still found among the Chinese, with the same signification. The *5*, *mem*, signifies *water*. The corresponding Samaritan and Ethiopian characters have a clear resemblance to the Chinese hieroglyphic for water. Lastly, the *N*, *aleph*, (originally perhaps signifying *ox*) signi-

fies unity, the action of conducting, pre-eminence. The Plectrician form of this letter exactly represents the Chinese character for one, and every action by which we are at the head of others. But these letters are not only significant by themselves, but secondly in combinations. Thus 一 was expressed by the monosyllable *ya*, *ye*, or *yo*; to this another monosyllable, which had equally a signification relative to the figure being added, formed a word of two syllables. For instance, instead of the present denomination of 一, *dalet*, we may reasonably suppose its original found to have been *de*. The word 一, *yad*, hieroglyphically represented by a gate and a hand, is found in the Hebrew with a signification derived from that of the letters composing it; *to cast out*, (as we might say, hand him to the door,) *to extend*. Ad to this the word 一, *ain*, (originally, probably, founded *ho*), which signifies the eye, and we have *yadho*, which should signify *to open the eyes, to extend the view*, &c. and metaphorically, *to know, to understand*; and in fact this is the signification of 一 in Hebrew. But this is not all, for exactly the same procedure has been adopted by the Chinese. *Ki*, which signifies *to examine*, is composed of three radical characters, of which the first signifies the hand, the second a gate, the third the eye. So also *Kia* is composed of three characters, one signifying the teeth, the other two, gate or opening, which signifies *to break through, to make a great opening*. In Hebrew, 一 is similarly composed, and signifies *to plunder, to lay waste*.—*Tebi* is a large collection of water. It was composed of the characters for hand and water. The same compound was formed among the Hebrews, and 一, *gam*, signifies a great collection of water, or the sea. In Arabic the letters *th*, i. e. earth, and *nim*, i. e. water, form the word *tham*, and signify a flood. The Hebrew *tham* is composed of the *th* or earth, and the *nim*, which signifies man, i. e. man of the earth, and further, *to form, to create*. In both these instances the Chinese correspond in their combinations with the alphabetical writing.—Many other instances might be brought. We will adduce one, to which there is no corresponding combination in the Chinese language. *Ab* or *Haba* signifies father; the component parts of it signify principal of the house.

The papers of De Guignes, to which we are very greatly indebted on this subject, are to be found in *Memoires de l'Academie des Inscriptions et des Belles Lettres*, vol. 34, &c. See ALPHABET, HIEROGLYPHICS, LETTERS, WORDS, and WRITING.

LANGUAGE, *Structure* of, comprehends the nature and arrangement of the different parts of speech. See each under its proper head. (See also GRAMMAR.) No grammatical rules, however, have sufficient authority to controul the firm and established usage of language. Established custom, says Blair (Lectures, vol. i.), both in speaking and writing, is the standard to which we must at last resort, for determining every controverted point in language and style. But it will not follow from this, that grammatical rules are superfluous as useless. In every language, which has been in any degree cultivated, there prevails a certain structure and analogy of parts which is understood to give foundation to the most reputable usage of speech; and which, in all cases, where usage is loose or dubious, possesses considerable authority. In every language, there are rules of syntax which must be inviolably observed by all who would either write or speak with any propriety. For syntax is no other than that arrangement of words in a sentence, which renders the meaning of each word, and the relation of all the words to one another, most clear and intelligible. See SYNTAX.

Usage and custom, says F. Buffier, are the rule of a language; and these hold their empire independent of reason,

or any other cause: nor has reason any thing to do in language, unless to study or teach it, such as it is. Here then commences grammar; a just plan of which supposes a language already introduced by use, and, without pretending to alter or amend a title, only furnishes reflections, called *rules*, to which the manners of speaking used in that language may be reduced; which assemblage of reflections is what we call the *grammar of that language*. This remark may obviate an abuse introduced among grammarians, who are ever crying out, "Usage is, in this point, opposite to grammar; or the language here frees itself from the rules of grammar, &c."

It is chance then to which we owe usage, and usage that makes the rules and measures of language. Usage, indeed, is somewhat dubious, and may be divided into *good* and *bad*. If it be asked, wherein the difference between these lies? it is in this; that the one is better established, or authorized, than the other; and if it be asked, wherein that difference of authority consists? it is answered, that in dead languages, that which makes the good usage is the writings of the best authors in that language; and if it be further questioned, which are the best? those are allowed such, who wrote when the state was in its greatest glory. Thus the age of Augustus, being the most distinguished by great men, who then flourished, we call that good Latin which is conformable to the manners of speaking used by authors, who wrote within fifty years before, and fifty after, the reign of that emperor. As to living languages; the good usage, or mode, is that which obtains among the most eminent persons, whether as to quality and authority, or as to learning and the reputation of writing well.

With this view it is, that M. Vaugelas defines usage of a language, the manner of speaking used by the soundest or best part of the court, conformable to the manner of writing among the best part of the authors of the time. But this definition, how judicious soever, may occasion infinite doubt; for which is to be deemed the best part of the court, and of the writers? Each party, doubtless, thinks itself the best. F. Buffier, therefore, very justly, instead of the best part, substitutes the greatest part, which brings the matter nearer to a certainty: the most numerous part being something fixed and palpable; whereas the most found part may be insensible or arbitrary. There is found a constant resemblance between the genius or natural complexion of each people, and the language they speak. Thus the Greeks, a polite, but voluptuous nation, had a language perfectly suitable, full of delicacy and sweetness. The Romans, who seemed only born to command, had a language noble, nervous, and august; and their descendants, the Italians, are sunk into softness and effeminacy, which is as visible in their language as in their manners. The language of the Spaniards is full of that gravity and laughtiness of air which make the distinguishing character of that people.

The French, who have great vivacity, have a language that runs extremely brisk and lively. And the English, who are naturally thoughtful, and use few words, have a language more concise and laconic, though far from being deficient in respect of copiousness.

LANGUAGES, the Diversity of, is generally allowed to have taken its rise from the confusion at the building of the tower of Babel. See CONFUSION OF TONGUES, and DISPERSION OF MANKIND.

As to the point of antiquity and priority among languages, that has been extremely controverted. Herodotus tells us, that in the dispute between the Egyptians and Phrygians about the antiquity of their languages, Psammethichus, king of Egypt, ordered two children to be brought up, with  
express

express prohibition not to have one word pronounced before them, but to leave nature to speak of herself; and the first word they spoke happened to be *becos*, which, in the Phrygian language, signifies *bread*. The Egyptians, however, were not convinced with this proof. The Arabs dispute the point of antiquity with the Hebrews; but the Jews, jealous, even to excess, of the honour of their nation, positively insist on it, that the Hebrew tongue, such as it is found in the Holy Scriptures, is the primitive language, and that spoken by the first man. For the arguments alleged in favour of this opinion, see *HEBREW Language*.

Of all the oriental languages, except the Hebrew, the Syriac has had the greater number of advocates, especially among the eastern authors. They have alleged, that a dialect of this language was spoken in Mesopotamia, Chaldæa, and Assyria, where mankind first settled after the flood, and where, it is presumed, the language of Noah and his sons remained: to which argument they add, that the names of persons and places mentioned by Moses are easily derived from that language. Besides those kindred languages, which are commonly called the oriental tongues, the Armenian, the Celtic, and the Coptic, pleading the antiquity of their nations; and the Armenians, that the ark first rested in their country: the Greek, on account of its great extent and copiousness, the Teutonic, from which some have pretended to derive even the Hebrew itself, and the Chinese, have aspired to preference, in point of antiquity.

The pretensions of the Chinese, in particular, have been supported not only from the great antiquity of that nation, their early acquaintance with arts and sciences, and their having preserved themselves so many ages from any considerable mixture or intercourse with other nations; but also from the singularity of the tongue itself, which consists of few words, all monosyllables, and is most simple in its construction, having no variety of declensions, conjugations, or grammatical rules. Besides, it is urged, that the Chinese are the posterity of Noah, and that Fohi, the first king of China, was Noah.

Mr. Webb, an ingenious writer in the reign of Charles II., strenuously maintains that this is the only original language, and that they now talk in China the language of Paradise.

Others maintain, that the language spoken by Adam is lost; and that the Hebrew, Chaldee, and Arabic, are only dialects of the original tongue. So far are they from giving the priority to the Hebrew, that they maintain Abraham spoke Chaldee before he passed the Euphrates; and that he first learned the Hebrew in the land of Canaan; so that this was not a special language consecrated to the people of God, but was originally the language of the Canaanites.

M. Le Clerc is of opinion, the Hebrew is far inferior to the Greek, both in copiousness, elegance, and perspicuity; it is dry, and destitute of ornaments, inasmuch that, wanting expressions to vary the phrase, the same periods are perpetually returning. The rabbins, converting its poverty into an excellence, say, it is so pure and chaste, that it has no proper names for the parts of generation, nor for those by which the excrements are discharged. See *HEBREW*.

The Arabic is held the most copious of all languages. See the Preliminary Discourse to Sale's Koran.

*LANGUAGE, Euphony of, for Singing.* It seems as if the vocal music of every country depended on the purity of the vowels, neat articulation of the consonants, and easy utter-

ance of the words of which a language is composed; and there can be doubt but that the dialect which has the greatest number of open vowels mixed with its consonants, is the most favourable for vocal purposes. The tones of voice can only be heard with purity and clearness by the assistance of vowels: as the words, *vowels* and *voice*, are equally derived from *vocalis*, which implies a *sound*, a *musical tone*, vocal melody, or modulation. And it is not only from the general facility with which the syllables of a language can be uttered with neatness and articulation that it is rendered favourable to the singer, but from the number of *vocal terminations*, or words ending with vowels, which allow the voice to expand, and finish a musical phrase with ease and purity.

It is generally allowed that the French language is *nasal*, the German *guttural*, and the English *silulating*, and loaded with consonants, nasal syllables ending with *ng*, and other harsh and mute terminations. We have, indeed, filed off the Saxon roughness in words where *gh* occur: as *cough*, *trough*, *laugh*, *plough*, *through*, *eight*, *freight*, *enough*, &c. which used to be pronounced in the Teutonic manner, and which are still guttural words in Scotland, and some parts of England.

But besides the obstructions which the voice meets with in its passage, from clashing consonants in the middle of words, we have a greater number of terms that end with absolute mute and abrupt consonants, than either the French or Germans: such are those which terminate in *b*, *d*, *g*, *h*, or hard *c*, *p*, and *t*. And it is not easy to defend our language from the *hissing* of which it is accused by foreigners, on account of the frequent use of the letter *s* at the end of words, and the great number of words which terminate with a double *s*. For though the plural number of French nouns is distinguished in writing by an *s*, as well as the English, yet the final *s* is never pronounced. The German plurals too are terminated by the letter *n*: as *haus*, *hausen*; *strass*, *strassen*; *pserd*, *pserden*; &c. in the same manner as *hous* is used to be *hausen* in the plural, *hose*, *hosen*; and as the substantives *ox* still has *oxen* in the plural. And the letter *n* being a liquid, renders the words which it terminates less difficult to utter, as well as less offensive to the ear, than the letter *s*, with which we have more words begin and end than with any other letter in the alphabet. Indeed, modern refinements or corruptions in pronouncing our language have greatly augmented the sibilation with which we are justly charged, by changing the *eh* and *ah* of verbs into *es* and *as*; and saying *gives* for *giveth*, *has* for *hath*, &c.

The learned Dr. Wallis, a profound musician, in his treatise "De Loquela," prefixed to his Grammar of the English Tongue, has considered with great exactness the accurate formation of all sounds in *speaking*, to which few have attended before; but with respect to *singing*, the work is still to be done.

Dr. Holder, who was a very learned musician and a composer, though he has admirably analysed the principles of pronunciation, and described the organs of utterance, with respect to colloquial language (Elements of Speech; an Essay of Inquiry into the natural Production of Letters, 1669), has not pointed out the means by which the musical voice in articulating words is assisted or impeded in its formation and delivery, or the causes of its arriving at the ear with more or less clearness and purity. It was a subject that did not immediately concern the purport of this excellent essay, which was written with the benevolent intention of assisting persons born deaf and dumb to comprehend the speech of others by the eye, from its effect on the external organs; and, therefore, the omission of such en-

quires as seem necessary in this place cannot be termed a defect.

Rouffleau, in his ingenious and spirited "Lettre fur la Mufique Françoife," has confined his remarks chiefly to the vices of the French language; but to all, except the natives of France, a lefs eloquent and forcible writer might eafily have proved it unfit for every kind of vocal mufic, fuperior to a "Vaudeville," or "Chanson à table:" for the words of thefe compositions being their principal merit, the hearer is the lefs inclined to judge feverely of the mufic, or the finger, provided he lofes none of the wit or ingenuity of the poem. And, indeed, it is at the *serious* French opera, and by the performance of *flow mufic*, and *airs tendres*, that thofe accuftomed to good finging are moft offended. However, in the parallel which Rouffleau has drawn between the languages of France and Italy, after defcribing all the inconveniences arifing to a finger from the compound, mute, nasal, and dead fyllables, of the French language; he afferts, that the paucity of fonorous vowels, and abundance of confonants and articulations, force the lyric poet to exclude many words, and allow the mufical compofer to give only elementary, or fhort and fingle founds, to the others. There is no language in which *all* the words of its vocabulary are equally fit for mufic, or lyric poetry; according to Salvini, out of forty thoufand words in the Italian language, only fix or feven thoufand can be adopted by the writers of *serious* mufical dramas. Indeed, fome of thefe rejected words, by their want of dignity, as well as foftnefs, may be unfit for lyric compositions. Hence, the melody neceffarily becomes infpid and monotonous, and its movement flow and tirefome; for if the time of fuch mufic be at all accelerated, its velocity refembles that of an angular body rumbling on a pavement. He goes on with his itricures, and fuppofes, that "fuch a language as he hath been defcribing, has a bad profody, unmarked, without exactitude and precifion; that the long and fhort fyllables have no fenfible and determinate proportion between them in duration, or numbers, by which the rhythm can be rendered agreeable, exact, and regular; that it has both long and fhort fyllables of an uncertain duration, with others that are neither long nor fhort; and that the difference between them is wholly incommenfurable.

"Thefe vices and inconveniences," he adds, "have fuch an effect upon the time or meafure of mufic, when applied to fuch words, as to render it wholly unmarked, irregular, and difjointed.

His character of the Italian language, and defcription of its beauties, and advantage over all others, for vocal purpofes, are fo appofite to the prefent enquiries, that we fhall faithfully tranflate the whole paffage.

"If it fhould be asked what language is the moft grammatical, I fhould answer, that of the people who reafen the beft; and if it fhould be asked what people are likely to have the beft mufic, I fhould fay, thofe that have the beft language for it. Now if there is in Europe one language more favourable to mufic than another, it is certainly the Italian: for this language is foft, fonorous, melodious, and more accentuated than any other; four qualities peculiarly important to vocal mufic. It is *foft* from its articulations being un-compounded; from the infrequency of claffing confonants; and from every word in the language being terminated by a vowel. It is *fonorous* from moft of its vowels being open; its diphthongs un-compounded; from having no nasal vowels; and from its articulations being few and eafy, which render the found of each neat and full. It is *melo-dious* from its own native fweetnefs, which renders it vocal even in declamation and common fpeech, without the affift-

ance of mufical notes. But what renders the Italian language more peculiarly mellifluous, as well as more expreffive of fentiment, than any other, is the great compafs and variety of its tones, and the choice it allows in painting the paffions. To prove this, let any one who imagines it to be only the language of love and tendernels, take the trouble of comparing the two following ftanzas of Tafto."

"Teneri fdegn i e placide è tranquille  
Repulle e cari vezzi e liete pace,  
Sorrisi, paretette, e dolce ftille  
Di pianto e fofpir, tronchi e molli bacci  
Fufe tai cofe tutte, e poefcia unille,  
Et al foce tempo di leute finto;  
E ne formo quel fi mirabil cinto  
Di ch' ella avena il bel fianco fuccinto."

Canto IV. Stanza xxxiii.

"Chiama gl' abitator de l' ombre eterne  
Il rauco fuon de la tartarea tromba;  
Treman le fpaziofe atre caverne,  
E l' aer cieco a quel romor rimbomba;  
Ne fi fridendo mai de la lugerne  
Regione del cielo il folgor piomba,  
Ne fi cofcia giammai tremare la terra  
Quando i vapori in fen gravida ferra."

Canto XVI. Stanza xxv.

It will be found, perhaps, equally difficult to exprefs in any other language the fweetnefs of the one or the vigour of the other of thefe ftanzas. But the roughnefs of the laft ftanza does not confift in hard and uncouth words; they are all fonorous, and, though rough to the ear, eafy of utterance.

Thefe ftanzas, however, which Rouffleau, and, after him, almoft all mufical writers have inftanced as of remarkably eafy utterance, fhould have been confined to reading and declamation; for better lyrical or vocal verfes may be found in Metaftafio, and, indeed, in almoft all Italian lyric poets, fince it has been found that the vowel *a* is the beft for divifions, and all the other vowels have been long in difufe for fuch purpofes, by the beft Italian compofers for the ftage. In the ftanza cited as a model of foftnefs, in vocal verfes, there are but two words, to which, in a lively air, divifions would be given: *Caris, pace*. But even thefe, in which the vowel *a* occurs in the *firft* fyllable, would have no long divifions affigned them, if there was a *final* fyllable terminated by that letter, as in the third perfon fingular of the future tenfe of verbs, *vedrà, ucciderà, farà, darà, parlerà, canterà, fuggirà*; in the elifion of the infinitive mood, *trionfar, fipofar, fcordar, hifingar, naufragar*; and in the fubftantives, *fedità, pietà, felicità, libertà, erudetlà, and Mar*.

In fetting Metaftafio's early operas, till about the middle of the prefent century, we find the beft compofers giving divifions to the vowels *o* and *e*; as in *morirò, dovrò, fugirò, re, te, fe, fremè, vender, voler, è, mercè*, &c. but never to *i* or *u*.

Rouffleau declined difcuffing the accents of the Italian tongue; but if, as has been imagined, the Greek accents were ufed as a notation of the tone or tune of voice in reading or fpeaking; the acute accent raifing the voice, the grave deprefing it, and the circumflex keeping it at a middle pitch or tone, the Italian would afford a more varied and pleafing melody than any of the other European dialects.

All *tunable founds*, fays Dr. Holder, of which the human voice is one, are produced by a regular and equal vibration of the fonorous body and undulation of the air, proportioned

to the acuteness or gravity of the tone. And, according to Dr. Wallis, this gravity, or acuteness of tones in speech, depends on the openness of the aperture in the larynx, which is the seat of the voice; and roughness and smoothness of vocal tones, he refers to the state of this organ.

But as these learned philologists have only dissected our alphabet, and analysed the pronunciation of our language, as far as concerns its articulation in speech, we shall examine it with respect to lyric poetry and singing, to which our remarks will be strictly confined.

If it be considered that of the five vowels in European alphabets, only two, *a* and *e*, are favourable to the clear emission of vocal sound; that of the nineteen consonants eight are absolutely mute, as *b*, hard *c* and *g*, *h*, *k*, *p*, *q*, *t*; seven semi-mute, that is, allowing only a murmuring noise, but no musical found, as *f*, *m*, *n*, *s*, *v*, *x*, *z*; that the soft *g* and consonant *j* are likewise of this kind; and that *r*, though accounted a liquid, only admits of a snarling, canine kind of a noise; *l*, indeed, is a true liquid, allowing a continuation of sound after it is formed; and *w* and *y* may be accounted semi-vowels; yet so numerous are the impediments to a neat, clear articulation, as well as sweetness and purity of musical tones, that some care should at least be used by the lyric poet in the selection of words, as well as great precaution by the composer, who gives them a melody.

If our alphabet be critically examined, in order to discover the effect which each letter has upon the voice in singing; it will be found that peculiar letters, as well as combinations of letters, have peculiar vices and tendencies to impede or corrupt musical sounds, both in their formation and passage: that *f* admits only of a whisper; for though regarded as a semi-vowel on account of its allowing us to breathe after it has been pronounced, without altering the form of the mouth; yet, as Dr. Holder has well observed, "it is one thing to breathe, and another to vocalise that breath." *M*, *n*, and *ng*, likewise allow us to breathe; but as it is only nasal breath, the sound we are able to emit is *stuffy* and impure. *S*, and its substitute, soft *c*, are *hissing*; *v* and *z* afford only a *jarring* buzz, by the vibration of the teeth and underlip, like that of a wasp or bee; *th*, cannot be uttered without a *hiss*; and the Saxo-Norman syllables *ble*, *cle*, *fle*, *gle*, *kle*, *ple*, *tle*, are all unmusical, and of difficult utterance.

The vowel *a*, according to our manner of founding it in the words *all*, *ball*, *call*, &c. affords the purest and most open passage to the voice through the mouth; and long divisions and vocal effusions should be appropriated as much as possible to this vowel, which is still more convenient to the singer when combined with no other letter, which alters the form of the organ. *O*, a lows a free passage to found; yet, as it separates the lips and teeth less than the letter *a*, it is in less favour with singers: however, the English words *blow*, *slow*, *glow*, *flow*, *woe*, &c. are well calculated for musical divisions. *E*, *i*, and *u*, partake of the nature of consonants, by putting the organs of speech in motion when they are first founded; and in dwelling upon these vowels no *voce di petto*, no voice can be produced from the chest, as they confine it to a small part of the mouth, or render it nasal. Indeed, the *u*, by almost closing the lips, allows but a very narrow and inconvenient passage to the voice; the *i* and the *e* are more favourable to a falset, a *voce da testa*, or feigned voice, than to a true *portamento*, or conduct of the voice.

Tosi, in his "Opinioni de' cantori antichi e moderni, o sieno osservazioni sopra il canto figurato," or florid song, fourscore years ago, recommended the exercising of the voice upon the three open vowels, which, with the Italians,

are *a*, *e*, *o*, equivalent to our *aw*, *a*, *o*. The Italian *i*, founded like our double *e*, and *u* as our double *o*, are never honoured with divisions or long sounds by the best composers or singing masters of Italy.

As open vowels are the most desirable to singers; so distinct, determinate, and uncompounded consonants, are the best crutches for the voice to lean on; for a neat, clear, and articulate pronunciation of consonants is as necessary to the intelligence of what is singing, as open vowels are to its being well sung. The letters *p*, *t*, *k*, for instance, are such clear and distinct articulations, that the voice, after any one of them, is delivered with a gentle kind of explosion, which considerably augments its force.

The *i*, in English, as it is founded in the word *smile*, and which is so peculiar to English mouths, seems a diphthong, compounded of *e* feminine, and *y*, or the Greek diphthong *ei*, or rather the German *ei*, as founded in *eisenac*, *eichner*, &c. and not a simple, or original vowel. Indeed, most of the diphthongs in our language require action in the organ, and spring in the muscles, as *oy*, *oy*, *eu*, *ou*, in the words *boy*, *boy*, *Europe*, *our*.

As accent and emphasis have great influence in varying the found of oral language, they are not indifferent to vocal melody: the Italian tongue, though it is easy to pronounce, and soft and mellifluous to the ear, from the openness and frequency of its vowels; yet the articulations of its consonants are more firm, vigorous, and poignant, than in any other language; and as every dialect has peculiar inflections of voice which form a kind of *tune* in its utterance, the Italian seems to have a greater compass and variety of intervals in this colloquial *tune*, or *cantilena*, than any other with which we are acquainted.

Diomedes calls accent the soul of speech, *anima vocis*. And every word of more than one syllable in prose, must have one emphatic or accented syllable among the rest. However, in verse, this rule cannot be observed without absurdity.

"Of man's first disobedience, and the fruit  
Of that forbidden tree," &c.

"Awake my Saint John, leave all meaner things  
To low ambition, and the pride of kings"

In each of these two last verses, were they set in recitative, which is the best musical criterion of accenting any language, there can only be two emphatic, accented syllables: as in Handel's opening of "Alexander's Feast;"

"'Twas at the royal feast, for Persia won"

A syllable in English, as well as Latin, which has two consonants after a vowel, is long, except one of these consonants be mute, and the other a liquid, as in *rêgret*, *rêplète*. Indeed, the accented syllable in our words which have double consonants, is short: so that accent and long do not always imply the same thing. In the case of double rhymes this rule should be observed: as *pleasure*, *measure*, *manner*, *banner*; which should all have short notes. Here *accent* and *quantity* certainly differ. By applying Italian melody to English words, we seem to lose in sense what we gain in found. The universality of double rhymes in Italian poetry must have an influence upon vocal melody, which our single rhymes but awkwardly imitate.

Dacier, in a note to his translation of Plutarch's Life of Lycurgus, says, that "the progress of music, in all times, has ever been proportioned to the genius and language of the people." The ancient Romans, though great in arms, agriculture, and literature, were not successful cultivators

of the fine arts; and nothing was achieved in them, throughout their empire, but by Grecian artists. For this we may, however, account, by the slaves only being allowed to cultivate the polite arts, among the Romans; whereas, in Greece, on the contrary, they were wholly prohibited their use.

No visionary innovation, or fantastical change, is here intended, in a language so excellent as our own for every purpose of reason, science, philosophy, and we may surely add, poetry; all we would recommend, is care to our lyric poets in the selection and arrangement of syllables, as well as unity of subject (see Italian Tour. p. 48, and our articles SONG, SYMMETRY, and UNITY of *Melody*), and attentive observance to the composers who let them to music, not to dwell on harsh, mute, nasal, or guttural words, which either preclude or vitiate all musical sound.

*Song* and *sing*, unfortunately, the two most common words in our lyric poetry, begin by a *hiss*, and end with a sound entirely nasal; and if we examine the syllables which terminate each line in Dryden's Ode on St. Cecilia's Day, the best of our lyric poems, and perhaps the most noble production, to read, of modern languages, we shall find that the dead letter *d* predominates; terminating in the course of the poem no less than two or three and thirty lines; in more than half of which, this hard and dumb letter is preceded by *n*, which, though it does not wholly silence the voice, yet allows it no passage, but through the nose. However, this junction is not so injurious to vocalised sound, as *ng* in the words *sung*, *young*, *beginning*, *winning*, *destroying*, *enjoying*; or *z* and *z* in *ears*, *hears*, *spheres*, *comes*, *drums*, *prize*, *skies*, &c. which terminate each musical phrase or period with a hiss. The impervious consonant *t*, in *state*, *state*, *state*, &c. preceded by a vowel, is less difficult to pronounce, and less offensive to hear, than the sibilation in *breath*, *oppress*, &c.

Admirable and sublime as this ode is in the perusal, some of the lines are extremely difficult to sing, without injuring either the poet or musician; the first, by a languid and inarticulate utterance, or the latter by a pronunciation-too rough and violent. The recitatives may, with propriety, admit of strong accentuation, as only such a portion of sound is wanting as will render the words more audible, and nearer singing, than mere speech: but as recitative is the medium between declamation and musical air, some attention seems necessary in selecting the words, and polishing the verses, even for this narrative melody; in slurring harsh alliterations, such as in the lines, *thrice he flew the plain—the sweet embusiasm from her sacred shore*, &c. where there is a constant and unavoidable hissing upon all the accents; and in placing such words at the pause, or hiatus, in the middle as well as at the end of each line or verse, where the punctuation requires a repose, or long note, as will neither wholly silence the voice, nor impede its expansion. If such precautions should be thought necessary for words of quick utterance in recitative, still more solicitous should the lyric poet be in the choice and arrangement when he writes an air, where every syllable is lengthened and vocalised, and where the vowel in each is all that the composer can tune, or the finger sweeten and refine.

It is very natural for poets to wish that the language, in setting it to music, should be more respected than it has generally been, particularly in our church compositions, by old masters, which the late Mr. Mason, in his "Anthem Book for York Cathedral," has very justly censured; but he commends Tucker, who was gentleman of Charles II's chapel, for his very accurate attention to accent and length of syllables; and sums up the excellencies and defects of

our ecclesiastical composers brought up in the King's chapel, after the Restoration, by speaking with exact discrimination of "the pleasing melodies of Wile; pathetic airs of Clarke; majestic movements of Blow; and sublime strains of Purcell."

But Purcell, the pride of every Englishman who loves music, was, in general, not only accurate, but happy and touching in the expression of words. Many of his melodies are, however, now become wholly obsolete and uncatch, from the temporary graces, with which he overladed them, for the sake of ignorant fingers; and, indeed, he wrote for no other. But these being the firebells and flourishes of a particular period, are very short-lived, and soon disgrace that melody which they were intended to embellish.

LANGUAGES are in general divided into *original* or *mother-tongues*; as the Hebrew and Arabic, in the East; the Teutonic and Slavonic, in the west.

LANGUAGES, *Secondary*, or *derivative*, which are those formed out of a mixture of several others, as Latin, French, &c.

Kircher will have the Coptic a mother-tongue independent of all others. See *Coptic*.

Du Jon maintains the Gothic a primitive language, and the mother of all the Teutonic tongues; that is, of all those spoken in the north. See *Gothic*.

Some add the Basque, or Biscayan, and Bas Briton, to the number of mother-tongues, imagining them to have been those of the ancient Celtæ, or Gauls.

LANGUAGES, *Learned*, or *Dead*, are those which only subsist in books, and which must be learned by the rules of grammar; as the Greek, Hebrew, Syriac, and Chaldee.

Raymond Lully solicited the establishment of the study of the learned languages a long time, in the thirteenth and fourteenth centuries. At length, in the year 1312, pope Clement, and the council of Vienne, appointed, that in the court of Rome, and in the universities of Paris, Oxford, Bologna, and Salamanca, there should be instituted professors of each, who should have salaries from the respective courts. The monks, however, vigorously opposed the spreading of these studies; and with so much success, that Erasmus tells us, in his time, "Græce nosse suspectum, Hebraice prope hæreticum."

LANGUAGES, *Living*, are those still spoken in some country or other; and which may be learned by conversation. The most popular among these are the French, Italian, Spanish, and English.

The Spaniards seem to place the nobleness and gravity of their language in the number of syllables, and the swelling of words; and speak less to be understood, than to be admired. Their terms are sonorous; their expressions haughty; pomp and ostentation run through all they say; their language cannot paint a thought to the life; it always magnifies it; frequently distorts it; and does nothing, if it does not exceed nature.

The Italian tongue does not swell up things to that degree, but it adorns and embellishes them more; yet these ornaments and embellishments are not real beauties. The Italian expressions, thus rich and brilliant, are like those faces covered with patch and paint, which make a fine show; but the finery is all deceit.

The French language (as some of their authors express themselves) is simple, without lowness; bold, without indecency; elegant and florid, without affectation; harmonious, without swelling; majestic, without pride; delicate, without softness; and strong, without roughness. Though, as to the points of strength and majesty, the French must give

give way to the English; which in these, as well as in copiousness, exceeds most of the living languages; as far as it is inferior to some of them in smoothness and delicacy.

Of all the modern languages, the French is generally allowed to be the most clear, and fit for philosophical and critical subjects; the chaste and most reserved in its diction; the most judicious and severe in its ornaments.

The language of France, for vocal purposes, may be compared with that of Italy. That the Italian language is favourable to the pure emission of sound, and consequently to singing, and the French the contrary, none but a native of France will dispute. Yet M. Framery, a man of taste and knowledge of music, and who sometimes seems to feel and acknowledge the defects of French music and its language for vocal purposes, says in the *Encyclopédie Methodique*, p. 235: "de célèbres compositeurs, Messrs. Duni, Gluck, Piccini, Sacchini, ont dit, ont écrit, qu'ils aimoient mieux composer sur la langue Française que sur la langue Italienne!" *credat Judæus*. M. Framery never surprised us more, or convinced us less. These composers may have said something flattering to the French, in public about their language, while at Paris; but in private, Gluck and Sacchini, to our knowledge, spoke of French as a musical language with no great respect. The Italians have often pretended, in Scotland, to prefer Scots tunes, and in Ireland, Irish, to Italian music. Geminiani and Tenducci did this in both countries; but in England, and among their own countrymen, they turned to ridicule both these national musics, more than they deserved; for though, when sung by fine singers, they lose their chief merit of originality and simplicity, when sung by the natives, they are extremely pleasing, and often truly touching.

Of all others, the English is said to be the most honest, open, and undefining language. With all its sublimity, it is gay and pleasant on occasion; but its gaiety is still moderated and restrained by good sense; it hates excessive ornaments; and, for the greater simplicity, would almost choose, as some say of the French, to go naked; it never dresses more than decorum and necessity require.

The English language is derived from so many and such different sources, that, on this account, it is deficient in regularity and analogy. Yet we have this advantage to compensate the defect, that what we want in elegance, we gain in copiousness, in which last respect few languages will be found superior to our own. See ENGLISH.

Ennius and Cæcrops are celebrated for their knowledge of many languages. Mithridates, king of Pontus, it is said, understood twenty-two tongues, which was the number of different people over whom he commanded; and those languages he knew so well, that he was able to harangue each of his people in their own tongue. It was a saying of Charles V. "That so many languages as a man understands, so many times he is a man." Sultan Soliman's interpreter spoke perfectly well seventeen different languages. But among the moderns, none has been more remarkable in this way than Pottellius; who, besides a perfect knowledge of all the dead languages, was so well acquainted with the living, that it is said he could have made the tour of the globe, without the use of an interpreter. See our article JONES, *Sir William*.

Biblander has written of the analogy and proportion of languages and letters, *De Ratione Communi Linguarum*, in 1518. Gesner, of the *Difference of Languages*, in 1572. Lazius published an Introduction to the Learning of the politer Languages, in a common Method, in 1548. Messiaser, a scheme of forty different languages, and different dialects, specimens of each whereof he gives in the Lord's

prayer, in 1593. De Recols, in his Addition to the *World of Daviti*, has published the *Pater-noster* in all the languages spoken among Christians; and Mr. Chamberlayne proposed to do the same in a hundred languages, a specimen of which has been published. Albericus Gentilis wrote of the mixture of languages, in 1633. And father Reiznier's *Discourse on Etymologies*, is a work of the same kind. In 1613, Durer published a treasure of the history of all the languages in the universe. Guichart has a treatise of the etymological harmony of languages, published in 1619. Brewwer has given us curious enquiries into the diversities of languages and religions, published in 1635.

LANGUAGE, *Philosophical*. See CHARACTERS, *Universal*.

LANGUAGE is also used, in the order of Malta, for *nation*. The knights of Malta are divided into eight languages; three whereof are for France; *viz.* the languages of Provence, of Auvergne, and of France; two for Spain, those of Castile and Arragon; the other three are the languages of Italy, England, and Germany.

Each of these languages has its chief, who presides in assemblies of the language to which he belongs. See MALTA.

LANGUAGE, *Frank*. See FRANK.

LANGUAGE *Hellenistic*. See HELLENISTIC.

LANGUAGE, *Law*. See LAW LANGUAGE.

LANGUED, LANGUAGE, in *Herakly*, is applied to such animals whose tongues appear out of their mouths: being of a colour different from that of the body of the animal.

LANGUEDOC, OCCITANIA, in *Geography*, a portion of Gallia Braccata, a maritime province (as it was denominated before the revolution,) bounded on the N. by Guienne, Auvergne, and Lyonnais, on the E. by the Rhone, on the S. by Foix, Roussillon, and the Méditerranæan, and on the W. by the Garonne. It lies between 42° 40', and 45° 20' N. lat., and between 1° 20', and 4° 45' E. long. In 43° 30', the parallel of Toulouse nearly, it extends 53 leagues from W. to E.; but towards either extremity, it does not exceed 33. Its breadth, for the greatest part, is 33 to 38 leagues, except towards the middle, where it scarcely amounts to 40 miles. The coast from Agde eastward is considerably augmented, the sea having retired, as appears by comparing the situation of the maritime places in ancient and modern times. The surface of this province consists of mountains and vallies, hills and plains. In the mountains, called the Cevennes and its branches, which are partly covered with forests, there are lead and iron mines. The lower tracts are fertile, and well watered, yielding grain, wine, and fruit; but one-half of the province is of an ungrateful and unproductive soil. The principal rivers are the Rhone, Garonne, Loire, Gardon, Villed, Erault, Orbe, Aude, Arriege, Allier, Tarn, and Lot. In this province many canals have been formed for commercial purposes.

Languedoc has been sometimes divided into Upper, Lower, and the Cevennes; the Upper, including nine dioceses, the Lower, containing 11 bishoprics, and the Cevennes, comprehending three. Geographers have divided this province into Upper and Lower; containing three archbishoprics, 23 bishoprics, 61 abbies, 637 priories, 353 religious houses, 60 commanderies, 200 towns and villages, 2 universities, 6 academies, 1000 ecclesiastical, 342,758 families, and 1,560,000 inhabitants. The ecclesiastical division has been differently arranged since the revolution. The capital of Upper Languedoc was Toulouse, and of Lower Languedoc, Montpellier. It is now divided into seven departments, *viz.* the Ardèche, Lozere, Gard, Herault, Tarn, Upper Garonne, and Aude.

LANGUENBRUCK, a town of Switzerland, in the canton of Soleure; 14 miles N.E. of Soleure.

LANGUEPOUR, a town of Hindooſtan, in Bahar; 43 miles S.S.W. of Bahar.

LANGUET, JOHN BAPTIST JOSEPH, in *Biography*, ſon of Denis Languet, attorney-general to the parliament of Dijon, in which city he was born in the year 1675. He received the elementary parts of his education in his native place, and then went to purſue his ſtudies at Paris, where he reſided at the ſeminary at St. Sulpice. In the year 1698, he was admitted a licentiate of the faculty of the Sorbonne, and was ordained, ſoon after, a prieſt at Vienne, in Dauphiné. He returned to Paris, took the degree of doctor in 1703, and attached himſelf to the community of St. Sulpice, where, by the exertions of his benevolent labours, he rendered himſelf uſeful that he was choſen curate to M. de la Chetardie. The duties of this appointment he diſcharged ten years, and ſold his eſtate, that he might have it in his power to relieve the neceſſities of the poor. In the year 1714, he ſucceeded to the living of St. Sulpice, and finding the church much too ſmall for the number of his pariſhioners, he conceived the deſign of building a place that ſhould excel every other church in the world in magnificence, and architectural decorations. This great work he accompliſhed by means of donations, which poured in from all quarters the moment his intentions were made known. It was conſecrated, in the year 1745, with ſo much ſplendour, that Frederic II., king of Pruſſia, was induced, from an account which he read of the proceedings on that occaſion, to ſend a polite complimentary letter to M. Languet. He eſtabliſhed likewiſe “La Maifon de l'Infant Jeſus,” intended for the accommodation of 30 or 40 poor ladies of noble deſcent. Here they were boarded and educated in a manner ſuitable to them, but at the ſame time were taught to be uſeful. They were employed, by turns, in attending to domeſtic concerns, and in other offices that would render them ſerviceable to their relations in the country. Another object of this eſtabliſhment, was to afford an aſylum to more than eight hundred poor women and girls delitute of the means of ſupport, belonging either to the city or country. They were provided with daily food, and were made to earn their ſupport, chiefly by ſpinning cotton and linen. Without entering into the minutæ of the regulations of the place, it is ſufficient to ſay, that this eſtabliſhment has proved a moſt happy retreat for numerous unfortunate females, who had been abandoned, by infamous betrayals, to diſeaſe and wretchedneſs. Here, by good example and excellent moral inſtruction, they have been recalled to virtue, and habituated to induſtry, and many of them have proved uſeful and honourable members of the ſociety. For their encouragement when they quitted the houſe, they were paid in money the amount of what they had earned by their labour. Though the land attached to the houſe conſiſted of only fourteen French acres, yet it fed a ſufficient number of cows to give milk for upwards of two thouſand children in the pariſh; it alſo contained conveniences for pigs and all kinds of poultry, which were ſold for the benefit of the inſtitution; a bakehouſe, furniſhing more than a hundred thouſand pounds of bread monthly, which was diſtributed among the poor of the pariſh; ſpinning-rooms, an excellent and well cultivated garden, a noble diſpenſary, &c. The management and regularity with which every department in this houſe was conducted, either for the inſtruction, employment, or ſupport of ſuch a number of perſons, were to admirable, and gave ſo high an idea of the great directing hand, that cardinal Fleury propoſed that Languet ſhould be appointed ſuperintendent of all the hospitals in the kingdom; to whom he answered with a ſmile, “I have always ſaid, my lord, that the bounty of your eminence led me to the

hospital.” M. Languet's benevolent exertions were not confined to the objects already mentioned, but extended to the poor and wretched of every deſcription. No perſon was ever more active and ſucceſsful than himſelf in obtaining large alms and conſiderable legacies, which he diſtributed with admirable prudence and diſcretion. It is ſaid, on good authority, that he diſburſed about a million of livres in charity every year. Noble families reduced to poverty, were among the prime objects of his benevolent attention. At the time of the great dearth in 1725, in order that he might relieve the poor, he fold his houſhold furniture, his pictures, and curious and rare pieces of workmanſhip, and, in ſhort, ſcarcely left himſelf the bare neceſſaries of life. He was among the firſt to be preſent at fires, or any other ſcene of public calamity, where his prudence, ſelf-poſſeſſion, and univerſally reſpected character, rendered his advice and exertions eſſentially ſerviceable. He had a wonderful talent in diſcovering the different diſpoſitions of mankind, and he knew how to employ every perſon according to his capacity. This excellent man declined the offers made of ſeveral biſhoprics; his great ambition was to do good, and he had ample means for this as a pariſh prieſt. He died in the year 1750 at the age of ſeventy-five. His piety and application to works of benevolence did not prevent him from being a lively and cheerful companion. He poſſeſſed a fine genius, and was highly delighted with cheerful and amuſing ſociety. His younger brother, named John Joſeph, born at Dijon in 1667, roſe to conſiderable eminence in the church, and was 40 years archbiſhop of Sens. He died in 1753. He took a very diſtinguiſhed part as a controverſiaſt, in defence of the bull “Unigenitus,” and diſplayed much learning and acuteness in his polemical pieces, which were tranſlated into Latin, and printed in 1753, in two volumes folio. He was author of “A Tranſlation of the Book of Pſalms,” and of diſcourſes published in the collections of the French academy. Moreiri.

LANGUET, HUBERT, was born at Viteaux, in Burgundy, in 1518: after a preliminary courſe of inſtruction in his own country, he went to Italy for the ſtudy of the civil law, and took a doctor's degree at Pavia. Having met with a book of the reformer Melancthon's, he felt a great deſire of ſeeing the author, and, in 1549, procured an interview with him at Wittenberg, which terminated in his converſion to the Proteſtant faith. After this he ſpent ſeveral years in travelling over different countries in the north of Europe; in his tour he became acquainted with Gullavus, king of Sweden, who gave him a commiſſion to invite perſons ſkilful in the arts and ſciences from France to his dominions. In 1559, he accompanied Adolphus of Naſſau, prince of Orange, into Italy; after this he was nominated by the elector of Saxony to be his envoy to the court of France. He was deputed by that prince to the aſſembly of the ſtates of Augſburg in 1568, and was employed by him in other important negotiations. He was again ſent to France in 1570, when he pronounced a bold and eloquent harangue in the name of the Proteſtant princes of Germany before Charles IX. He reſided at Paris during the bloody maſſacre of St. Bartholomew, and expoſed his own life to danger by his efforts in ſaving his hoſt, Andrew Wechel, the famous printer, and his friend, Dupleſſis Mornei. After accompliſhing various other miſſions to the ſatisfaction of his employers, he died at Antwerp in September, 1581, at the age of 63, greatly regretted by all who knew him. The prince of Orange, in whoſe ſervice he had been employed, walked as chief mourner at his funeral. He was a man of pure virtue in corrupt and difficult times: “He was,” ſays one of his biographers, “ſuch as many would wiſh to appear; he

he lived as good men would wish to die." His works are "Collections of Latin Letters to the Elector of Saxony, to Camerarius, Father and Son, and to Philip Sidney;" "A Relation of the Expedition of the Elector Augustus against the Revolters of Saxony; with the History of the Proceedings of the Emperor against that Prince;" "Vindicia contra Tyrannos," which is a spirited attack upon tyranny, and a defence of the rights of the people. This appeared soon after Languet's death, and coming out with the name of Stephanus Junius Brutus, was attributed to various persons, but has been ascertained to have been the production of Languet. Bayle. Moreri.

LANGUETTE, *Fr.* the tongue of a jack in a harpsichord or spinnet; the valve which opens and shuts the wind chest in an organ to let the wind into the pipes, when a key is pressed down.

LANGUIDO and LANGUENTE, *Ital.* musical terms for a languid or languishing air.

LANGUOR, a faintness and indisposition to exertion, commonly accompanied with a lassitude or weariness, and arising from a feverish state, or from a general debility of the nervous and circulating systems.

LANGUR, in *Geography*, a mountain of Thibet; 40 miles E. of Tankia.—ALŌ, a river of Mingrelia, anciently *Astolpus*, which runs into the Black sea, about two miles from Anarghia.

LANGUT, a town of Prussia, in the province of Oberland; 10 miles S.E. of Morangen.

LANGWIESE, a town of Bohemia, in the circle of Leitmeritz; 20 miles W.N.W. of Leitmeritz.

LANJAN, LANDJAM, or *Lanjang*, a city of Laos, and capital of the kingdom, or at least of the southern division, to which it gives name, and the usual residence of the king; situated on the W. side of the river Mecon, and defended on the land side by ditches and high walls. The palace is of wide extent, and appears like a city, from its size and the number of people who inhabit it. The houses of the principal persons are high, elegant, and richly ornamented; those of the lower people are mere huts. The priests alone have the privilege of building their houses of brick or stone. N. lat. 18° 30'. E. long. 101° 38'.

LANIARDS. See LANNIERS.

LANJARON, in *Geography*, a town of Spain, in the province of Granada; 15 miles S. of Granada.

LANIERE, NICOLÒ, in *Biography*, was an Italian, who came into England early in the last century; there is a fine portrait of him at the Grange, in Hampshire, by Vanduyke. It was the sight of this portrait that determined Charles I. to employ that excellent painter. Lanieri professionally practised music, painting, and engraving; but his greatest excellence was in music. His own portrait, painted by himself, is in the music school at Oxford. He etched a considerable number of plates for a drawing-book; was an able connoisseur in pictures; and had the art of giving modern paintings an air of antiquity, and putting off copies for originals. Granger's Biog. Hist. of Engl. vol. i. p. 539.

It is recorded in the folio edition of Ben Jonson's works, printed 1640, that, in 1617, his whole masque, which was performed at the house of lord Hay, for the entertainment of the French ambassador, was set to music after the Italian manner, *silo recitativo*, by Nic. Lanieri, who was not only ordered to let the music, but to paint the scenes.

This short piece being *scabolly* in rhyme, though without variation in the measure, to distinguish airs from recitation, as it was all in musical declamation, may be safely pro-

nounced the first attempt at an opera in the Italian manner, after the invention of recitative.

But in the same year, in the masque, by the same author called "The Vision of Delight," presented at court during Christmas, there is a manifest distinction of *air* from *recitative*; in both which styles the whole piece, in verses of different measures, was performed. It is opened by Delight, personified, who, *silo recitativo*, "spake in song." Then Night, likewise personified, sung, "Break Fancy from thy cave of cloud, &c." This air ends in a chorus or *quire*. After which Fancy spake, in *silo recitativo*. Then Peace sung, "Why look you so, &c." After which an air that terminates in a *quire*. The song ended, "Wonder spake," in recitative. Then dancing, singing, and chorus.

Here we have all the characteristics of a genuine opera, or musical drama of modern times, complete: splendid scenes and machinery; poetry; musical recitation; air; chorus; and dancing.

Though the music of this masque is not to be found, yet of Lanieri's "Musica narrativa" we have several examples, printed by Playford in the collections of the time; particularly the "Ayres and Dialogues," 1653, and the second part of the "Musical Companion," which appeared in 1667; and in which his music to the dialogues is infinitely superior to the rest: there is melody, measure, and meaning in it. His recitative is more like that of his countrymen at present, than any cotemporary Englishman's. However, these dialogues were composed before the laws and phraseology of recitative were settled, even in Italy. His cantata of "Hero and Leander" was much celebrated during these times, and the recitative regarded as a model of true Italian musical declamation.

LANIGEROUS, any thing that bears wool. Hence, LANGEROUS, or *Languginus Trees*, among *Herbalists*, are those trees that bear a woolly downy substance; as, the black, white, and trembling poplars, oifers, and willows of all sorts.

LANINA, in *Geography*, a town of Russia, in the government of Irkutsk, near the Baikal lake; 80 miles N.E. of Irkutsk.

LANINI, BERNARDINO, in *Biography*, an historical painter, native of Vercelli, and a pupil of Gaudenzio Ferrari. He imitated the style of that master, in his first works, to a degree of illusion. As he advanced in practice he cast a bolder eye on nature, and, by equal vigour of conception and execution, proved to the first artists of Milano, that, like Ferrari, he was born for grand subjects: such is that of St. Catarini, near S. Celso; the face and attitude of the heroine anticipate the graces of Guido; the colour of the whole approaches the tones of Tiziano; the glory of the angels rivals Gaudenzio; a less neglected style of drapery would have left little to wish for. Among his copious works at Milano, and in its districts, the dome of Novara claims distinguished notice. There he painted those Sybils, and that semblance of the eternal Father, so much admired by Lomazzo, and near them certain subjects from the life of the Virgin, which even now in a ruined state of colour enchant by spirit and evidence of design. His versatile talent indulged sometimes in imitations of Leonardo da Vinci; and at the Basilica of St. Ambrogio, the figure of Christ between two angels, in form, expression, and effect, fully proves with what felicity he penetrated the principles of that genius. Fuseli's Pilkington.

LANIS *de crescentia Wallie traducuntis aliquæ custumæ,* &c. an ancient writ that lies to the customer of a port, to permit

permit one to pass wool without paying custom, he having paid it before in Wales.

**LANISCHLE**, in *Geography*, a town of Iliria; 16 miles S.E. of Capo d'Iliria.

**LANISTA**, in *Antiquity*, is sometimes used to signify an executioner, but more frequently for a master gladiator, who taught the use of arms, and had always people under them, ready to exhibit shows of that kind. For which purpose they either purchased gladiators, or educated children, that had been exposed in that art.

**LANISTA** was also used to denote one who taught game-cocks to fight.

**LANIUS**, in *Ornithology*, a genus of the rapacious tribe, having the bill rather straight, with a tooth, or notch, on each mandible near the end; the base naked; and the tongue jagged at the tip. To this character, assigned by Gmelin after Linnæus, may be added, that the nostrils are generally round, and covered with stiff bristles. Dr. Latham observes still further, that the birds of this genus are not furnished with a cere at the base of the bill, and that the middle toe is connected to the next as far as the first joint. Lastly, according to Scopoli, the segments of the tarsi are seven in number.

Linnæus, in the various editions of his *Systema Naturæ* and other works, has referred this genus of birds to several distinct families, having sometimes placed it with the chattering, sometimes with the titmice, and then again, from its habits of rapacity, with the accipitres, in which last-mentioned order it stands in the Gmelinian edition of that author's publication. Before the time of Linnæus, our countryman, Ray, had classed this tribe among the short-winged hawks: Buffon also had arranged it after the falcons; but Brisson, on the contrary, includes them with the thrushes and the chatters, two analogous genera, which obviously belong to the order passeræ. Kramer introduces it under the passerine order; Scopoli under the pies; and Pennant, in his "Genera of Birds," with the accipitres; from which, however, the latter writer removes it to the order pieæ, in a subsequent edition. Gmelin retains it still in the accipitrine order. In Latham's "Synopsis," and also in his "Index Ornithologicus," the example of Scopoli is followed; the shrikes are disposed at the head of the order pieæ, and this arrangement has obtained the sanction of the French ornithologists. We are far from wishing to intrude a solitary suggestion against established opinions, and those too of acknowledged merit; yet, on a point in which so much difference has prevailed, a suggestion may be allowed. The shrikes then appear to us, at least in a general view, less intimately connected with the pies than the falcon tribe, though confessedly allied to both; and in defining the precise line between, it is not impossible that a future era will concur in the accuracy of Gmelin, who incorporates them with the accipitres; or, in reverting still farther back to the example of Ray, our enlightened countryman, place them as the last of the falcon tribe.

The birds of this genus are dispersed throughout most parts of the globe: they are generally of a noisy, restless, quarrelsome, and ferocious disposition; prey on all the smaller kinds of birds as well as insects. The manner in which they destroy their prey is almost, if not entirely, peculiar to themselves, and evinces a degree of address and cruelty that has not inaptly obtained them the name of butcher-birds. Afterouncing upon their destined victim, which they usually seize upon in a defenceless state, while young, and in the nest, they bear it away to some thorny bush, and by the dint of dexterity force it upon one of the stoutest

and sharpest spines; after which they proceed to tear the yet living creature into pieces, separating its mangled remains by the assistance of their bill and talons, and dispersing on different spines of the bush such remnants of the flesh, after being for the present satisfied, as are reserved for future meals. In this manner, the shrike tribe also treat the larger kinds of insects, as well as birds.

#### Species.

**FORKICATUS**. Tail forked; frontal crest erect; body greenish-black. Linn. *Drongo*, Buff. *Gobe-mouche huppé de Malabar*, *ibid.* *Fork-tailed shrike*.

Length ten inches; size of a black-bird; tail long, and much furcated; crest sometimes wanting. Inhabits the Cape of Good Hope, Madagascar, and China.

**CÆRULESCENS**. Tail forked; body bluish-black; belly white. Linn. *La pie-grièche a queue fourchée de Bengale*, Briss. *Le fougab*, Buff. *Fork-tailed Indian butcher-bird*, Edwards.

Inhabits Bengal, where it is called fingham: the English settlers call it also the king of the crows, from the hostile disposition they constantly evince against those birds. Its length is seven inches and a half; the tail much forked, the outer feather spotted with dirty white.

**MALABARICUS**. Body bluish-black; quill and tail-feathers black; outer tail-feathers long, and without webs, except on the outer side near the tip. Lath. Ind. Orn. *Gobe-mouche de Malabar*, Son. *Drongo de Malabar*, Buff. *Malabar shrike*.

Length seventeen inches and a half. This species inhabits Malabar.

**CASTANEUS**. Tail cuneated; body above chestnut, beneath white; crown, nape, and hind-head cinereous. Lath. *Lanius castaneus*, Gmel. *Chestnut-backed shrike*.

Country unknown. The bill, wings, and legs black; front black. Length ten inches.

**LUÇIONENSIS**. Tail cuneated; body reddish-grey; tail-feathers banded with brown at the ends; a black spot on the head, behind the eye. *Lanius lucionensis*, Linn. *La pie-grièche de Luzon*, Briss. *Luzonian shrike*.

Length seven inches and a half; bill and body above grey-brown; beneath, and on the sides, reddish, with white lines; tail rufous-grey; the tip of each feather, except the two middle ones, rufous white; legs and claws brown. According to Brisson, the inhabitants of the island of Luçon, which it inhabits, call this bird *cabecote*.

**CRISTATUS**. Tail cuneated; head crested; body reddish, beneath waved with tawny and brown. Gmel. *Bengalensis rufus*, Briss. *Crested red, or rousset-coloured butcher-bird*, Edwards. *Crested red shrike*.

**CANADENSIS**. Tail cuneated; head crested; body reddish, beneath whitish. Gmel. *Lanius Canadensis*, Briss. *Pie-grièche huppé de Canada*, Buff. *Crested shrike*.

Length six inches and a half; the bill and claws black; crest reddish; cheeks dusky, with white spots; throat and breast yellowish-red; belly cinereous; wing-coverts black, edged with white; tail black, with white dots. This species inhabits Canada.

**LUDOVICIANUS**. Tail cuneated and cinereous; body above cinereous, beneath whitish. Gmel. *Pie grièche de la Louisiane*, Buff. *Louisiane shrike*.

Inhabits Louisiana. Length eight inches; under the eyes a black band; six middle tail-feathers black, the rest white at the base and tip.

**NEGETA**. Tail cuneated, white at the tip; body cinereous, beneath whitish. Linn. *Cotinga cinerea*, Briss. *Guiraru*

*Guiraru nhegeta*, Ray. *Guirarou*, Buff. *Grey pyc of Brasil*, Edw. *Grey shrike*.

Inhabits northern Europe, Brasil, Surinam, and other parts of South America, frequenting marshy places. Length nine inches. In this species the wings and tail are blackish; wing-coverts black, with the tips dull white; primary quill-feathers black, outer tail-feathers at the tip white.

**CVIROSTRIS.** Tail cuneated; body white; back black; first five quill-feathers with a white spot. Gmel. *Collurio Madagascariensis*, Briff. *Ecorcheur de Madagascar*, Buff. *Vanga ou beurde a ventre blanc*. Buff. *Hook-billed shrike*.

Both mandibles reflected at the tips; hind-head greenish-black; greater tail-coverts obliquely spotted with white; tail-feathers in the middle, within cinereous, without black, tip white; legs lead colour, claws blackish. A native of Madagascar, where the inhabitants distinguish it by the name of vanga. It feeds on fruits, and is said to whistle well.

**COLLURIUS.** Tail cuneated; body black, beneath white; first quill-feathers white at the base. Gmel. *Pie griefche du Cap de Bonne Esperance*, Buff. *Collured shrike*.

Native of the Cape of Good Hope. Length twelve inches.

**EXCUBITOR.** Tail cuneated, white at the sides; back hoary; wings black, with a white spot. Linn. *Lanius cinereus*, Briff. *Lanius cinereus major*, Cefn. *Caftrica palombina*, Olin. *Great cinereous shrike*, Arct. Zool. Donov. Brit. Birds, &c.

This species inhabits many parts of North America and Europe, and is the largest of its tribe found in Britain, where, however, it is extremely rare. The length is ten inches. The male differs very little from the female, except that the parts beneath in the former are entirely white, while those in the female are marked with fine semicircular brownish lines. The female makes her nest of heath and moss, lined with wool and other soft substances. The species chiefly inhabits woods: it feeds on insects and small birds, the latter of which it seizes by the throat, then fixes them on a sharp thorn, and tears them to pieces. When confined in a cage, it will often, if possible, contrive to affix its food against the wires, that in like manner it may pull it afunder with its claws and bill. In countries where these birds are abundant, the husbandmen treat them with regard, being especially useful in the destruction of rats, mice, and other vermin. There are some distinct varieties of this bird: in one the body is white, the legs yellowish, and the bill and claws blackish; and another in which the lesser wing-coverts and shoulders are reddish.

**COLLURIO.** Tail somewhat cuneated; back grey; four middle tail-feathers unicolour; bill lead colour. Linn. Fn. Succ. *Lanius minor rufus*, &c. Ray. *Merule congener alia*, Ray. *Ecorcheur*, Buff. *Lesser butcher bird, flyber, &c.* Will. *Red-backed shrike*, Donov. Brit. Birds, &c.

Length seven inches and a half; the head and lower parts of the back light grey; upper part of the back, with the wing-coverts, ferruginous; the tail black, with all the feathers, except the two middle ones, more or less white at the base; the outer web of the outer feather white; breast, belly, and sides blossom-colour; legs black. In the female, the head is dull ferruginous, mixed with grey; breast, belly, and sides dirty white, with semicircular dusky lines; tail deep brown, the outer feather only white on the outer web. This species is not very uncommon in Britain, where it is considered as a bird of passage. It lays six white eggs, marked with a rufous brown circle towards the large end.

The nest is generally placed in a hedge or low bush, near which, it is asserted, no small birds have the temerity to build, as it not only feeds on insects, but also on the young of other birds, which it seizes in the nest by the neck, and kills by piercing the skull with its bill, the brain and eyes being the parts it first devours. It is remarkably fond of grasshoppers and beetles, which it eats by morsels; and when satisfied, transfixes the remains on a thorn, to be eaten at another opportunity. This, like the grey shrike, has no note peculiar to itself: it is merely an adept in the imitative art, as its note is varied to that of any other birds it wishes to decoy within its power. Writers describe two or three varieties of this species, the most probable of which is the variegated shrike, l'Ecorcheur varie of Brisson. This is grey on the upper part of the body, and rufous-white beneath, the whole marked with transverse brown striations; the scapulars rufous-white, bounded by a parallel black stripe; the tail black, the three outer feathers rufous-white at the base and tips, the outer one wholly rufous-white on the outer edge. It is the lesser variegated butcher bird of Willughby, and is admitted as a variety by Gmelin and Latham. Gmelin is, however, mistaken in placing the following bird as another variety of the species collurio.

**RUTILUS.** Crown and nape rufous, surrounded with fuscous; front, scapulars, spot on the wing, and whole surface beneath whitish. Donov. Br. Birds. *Lanius rufus*, Briff. *Lanius rufus* (y *Collurio*), Gmel. *Lanius rufus*, Lath. *Lanius rutilus*, Ind. Orn. *Lanius pomeranus*, Mus. Carlsk. *Lanius minor cinerascens*, Ray. *Lanius minor rutilus*, Klein. *Ampelis dorjo griseo*, &c. Linn. Fn. Suec. *Pie-griefche rousse*, Buff. *Buferola*, Zinnar. *Wood-chat*, Albin, &c.

Extremely rare in Britain. Its size is equal to that of the common or red-backed shrike, and its manners, so far as we are acquainted with the species, are nearly the same, except that it never frequents woods, keeping constantly on the elevations or among the low bushes in the open plains; it inhabits Africa and Southern Europe chiefly. There is an apparent error among writers in considering the bird called by Buffon la pie-griefche rousse à tete noire du Senegal, as a variety of Lanius rufus. Levaillant describes Buffon's bird under the name of Tchagra, from the peculiar sound of its note, which resembles the repeated repetition of the words *teba-teba—teba-gra*, and assures us it is no other than a variety of the following species.

**SENEGALUS.** Grey, beneath whitish; crown, band through the eyes, and tail-feathers black; the last, except the two middle feathers, white at the tips. *Lanius Senegalus*, Linn. *Lanius Senegalensis cinereus*, Briff. *Senegal shrike*.

Length nine inches. Very common in Senegal.

**ANTIGUANUS.** Tail long and cuneated; body above yellowish rufous, beneath white, head, bill, wings, legs, and tail above black. Gmel. *Pie-griefche d'Antigue*, Sonnerat. *Antiguan shrike*, Lath.

Inhabits the Philippines and Panay ides.

**NIGER.** Black; tail somewhat cuneated. Gmel. *Black shrike*.

Native of Jamaica. Length seven inches.

**LEVERIANUS.** Tail long, cuneated, black at the tip; bill, head, neck, middle of the breast, and legs black, the rest white. Gmel. *Lanius picatus*, Lath. *Maggie shrike*.

Inhabits South America; length ten inches; greater wing-coverts and secondary quill-feathers white at the edge; two middle tail-feathers as long again as the rest, and which are black with white tips.

**RUFUS.** Rufous, beneath white; head greenish-black.

Linn. *Lanius Madagascariensis rufus*, Briff. *Schelt-bé*, Buff. *Rufous shrike*.

Length eight inches, the bill, legs, and claws lead-colour.

LEUCOEPHIALUS. Greenish-black; head, neck, and body beneath white. Gmel. &c. *Lanius Madagascariensis major viridis*, Briff. *Tcha-ebert-bé*, Buff. *White-headed shrike*.

Size of the last, and inhabits the same country.

ATRICAPILLUS. Tail cuneated, and with the neck, crown, shoulders, and wings black; body above mouse-colour, beneath blueish-ash. Merrem.

Native of Surinam. The length five inches; wings short; wing-coverts and secondary quill-feathers edged with white; tail-feathers, except the two middle ones, tipped with white.

POMERANUS. Body above black, beneath white, hind head and back of the neck dark rufous, furrounded with black; two spots on each side the wings and rump white. Sparmann.

Inhabits Pomerania; bill, legs, and wings black.

TYRANNUS. Body cinereous, beneath white; crown black, with a longitudinal tawny streak. Gmel. *Muscicapa tyrannus*, Briff. *Tyrant*, Buff. *Tyrant shrike*.

Native of America. Length eight inches. Builds in hollow trees, is fierce and audacious, and will even attack the eagle, fastening upon its back, and continuing to scream and peck with its beak till it forces the eagle to retreat. There are several varieties of this bird.

MAJOR. Grey; each side the head reddish; tail longer than the body, and pointed. *La grande pie-grièche*, Sonnini.

Size of the black-bird, the plumage greyish-ash; bill citron-yellow; legs brownish, claws black.

AFRICANUS. Body above black, beneath white, and a band of the same on the wings. *La pie-grièche silencieuse*, Sonnini.

Size of the common red butcher-bird of Europe, the bill horn-colour; iris and legs brown, and claws black. The female is rather smaller than the male, and the colours more obscure. The nest, which is constructed with much art, is placed among trees, and commonly contains from three to four eggs of a pale green colour. The young in plumage resemble the female. Inhabits Africa.

SCHACH. Body yellowish; front and wings black.

Linn. *Lanius a-foack*, Oibeck. *Chingé shrike*.

Native of Chi-na, in size resembling the species tyrannus. Head and neck on the upper part grey; neck beneath dull reddish-white; back and belly reddish.

PITANGUA. Body black, beneath yellow; crown with a tawny streak; band over the eyes white. Gmel. *Lanius pitangua*, Linn. *Pitangua guaca*, Ray. *Tyrannus Brasiliensis*, Briff. *Bentaveo*, ou *Cuiriri*, Buff. *Brafsian shrike*.

Length nine inches; bill thick, throat white; wings beneath yellow. Native of South America.

BARBARUS. Black, beneath red; crown and thighs tawny. Gmel. *Lanius Senegalensis ruber*, Briff. *Govolak*, Buff. *Pie-grièche du Seneegal*, *ibid*. *Barbary shrike*.

Length nine inches; the bill, wings, tail, feet, and claws black, head, neck, vent, and lower wing-coverts yellow. Inhabits Barbary.

SULPHURATUS. Fuscous, beneath yellow, head blackish, furrounded by a whitish band. Gmel. *Lanius Cayanensis luteus*, Briff. *Pie-grièche jaune de Cayenne*, Buff. *Beccarde a ventre jaune*, *ibid*. *Yellow-bellied shrike*.

Native of Cayenne, the length nine inches; chin and throat white; legs grey; bill and claws blackish; wings and tail brown, edged with rufous.

CAYANUS. Cinereous; head, tail, and primary quill-feathers black. Linn. *Lanius Cayanensis cinereus*, Briff. *Pie-grièche grise de Cayenne*, Buff. *Cayenne shrike*.

Size of a black-bird, the length eight inches and a half, bill at the base red, at the tip black; legs cinereous, claws black. Buffon describes a supposed variety, about the same size, that differs in having a longitudinal black streak down each feather. This is from Cayenne, as is likewise another variety of smaller size, with the front yellowish.

MADAGASCARENسيس. Cinereous, beneath whitish; lores black; tail-feathers reddish. Gmel. *Lanius Madagascariensis major*, Briff. *Calli-calie et Bruja*, Buff. *Madagascar shrike*.

Length scarcely five inches, and inhabits Madagascar. In the male, the chin and throat is black; in the female, white mixed with rufous.

AURANTIUS. Tawny yellow; chin, throat, and breast reddish; head, above the eyes, and nape black; wings and tail brown. Lath. Ind. Orn. *Orange shrike*.

Native of Cayenne. Length seven inches.

NOOTKA. Tail rounded; body above black, beneath white; crown black; collar white. Gmel. *Nootka shrike*, Lath.

Length seven inches; bill and legs black; above the eyes a white line reaching to the nape, and a black one beneath the nape; lesser wing-coverts black, greater white; tail-feathers black, the four outer white at the tips. Native of New Zealand.

EMERIA. Grey, beneath white, temples and rump red. Gmel. *Lanius Bengalensis fufcus*, Briff. *Muscicapa emeria*, Linn. *Rouge queue*, Buff. *Bengal red start*, Albin. *Bengal shrike*.

Length five inches and a half; the bill greyish-brown; crown and hind head black; abdomen and upper tail-coverts red; each side the neck four black curved spots. Native of Bengal.

JOCOSUS. Tail rounded; body grey; lower eye-lid purple; vent fanguineous red. Linn. Amæn. Acad. *Merula sinensis cristata minor*, Briff. *Jocose shrike*.

Size of a lark; length seven inches and a half, and inhabits China, where it is called Kowkai-kon.

BICOLOR. Blue, beneath white, frontlet black. Linn. Mant. *Loxia Madagascarina*, Syll. Nat. *Pie-grièche blue de Madagascar*. *Blue shrike*.

Length six inches and a half; the bill, head, margin of the quill-feathers, two middle tail-feathers, and outer margin of the four next blue, the feathers furrounding the bill, the quill-feathers, except at the base, outer tail-feathers, legs, and claws black; female beneath dirty white; tail slightly cuneated. Native of Madagascar.

LEUCORHYNOS. Body above blackish, beneath whitish; bill, breast, belly, and rump white. Gmel. *Lanius Manillensis*, Briff. *Pie-grièche de Madagascar*, Buff. *Longraien*, *ibid*. *White-bellied shrike*.

Inhabits Manila; length seven inches; wings, tail, legs, and claws black; tail equal.

FERRUGINEUS. Body above black-brown; throat and breast dirty-white; belly ferruginous. Gmel. *Ferruginous shrike*, Lath.

A native of the Cape of Good Hope; size the same as the cinereous shrike; the bill lead colour; tail dusky brown; legs black.

TABUENSIS. Body above olive; chin and breast cinereous; belly yellowish-brown; tail and legs brown. Gmel. *Tabuan shrike*.

Length eight inches; the bill brown; crown greenish; wings black on the outer edge. First described by Dr. La-

atham,

tham, from a specimen in the Leveerian Museum. It inhabits the Friendly isles.

**PACIFICUS.** Black; head and neck approaching to greenish; belly and tail more dusky. Gmel. *Pacific shrike*, Lath.

Described from an example of the species in the Banksian collection, found in one of the islands of the South seas. The bill is dusky; feathers of the head and neck very narrow; tail three inches long, dusky and even at the end; toes divided to the base, the middle one very long.

**SEPTENTRIONALIS.** Bill black; legs lead colour; body above brown; chin and breast cinereous; belly and vent brownish. Gmel. *Northern shrike*, Lath.

Length eight inches; four middle tail-feathers brown, the rest within white at the tip, and each two inches long; legs short; claws stout and brown. Native of North America.

**PILEATUS.** Head black and erected; body cinereous; throat and breast black; wing-coverts barred with white; tail black at the tip. Lath. Ind. Orn. *Black capped shrike*.

Native of Cayenne. Length six inches. Female without crest; throat and breast cinereous.

**VIRIDIS.** Head, wings, and body above dusky green, beneath white; tail black. Gmel. *Tcha-chert*, Buff. *Green shrike*.

Size of the last; the wings long; two middle tail-feathers dusky-green, the rest black at the outer edge; legs and claws black.

**VARIUS.** Body above cinereous brown; chin and breast yellow-buff; belly, rump, and vent dirty brownish-white; interfasculars white; tail and wings brown. Gmel. *White shouldered shrike*, Lath.

Described by Pennant as a native of Brazil; the legs and bill are black; front and cheeks with paler spots.

**LEUCOCEPHALUS.** White; body above greenish-black; head, neck, and under parts of the body white. Lath. &c. *Tcha-chert-bé*, Buff. *White-headed shrike*.

Length eight inches. This species inhabits Madagascar. **DOMINICANUS.** Black; belly and rump white. Gmel. *Pie-grieffche Dominicae*, Sonnerat.

Inhabits the Philippine islands; exceeds the sparrow in size; flies swift, is bold and troublesome to crows. Is by some presumed to be a variety of the preceding species.

**PANAYENSIS.** Bill and legs black; head, throat, breast, and belly red; crown, wings, and tail brown. Gmel. *Panay shrike*.

Seven inches in length, and inhabits the island Panay.

**ALBUS.** White; bill, tail, legs, and greater part of the wings, black. Gmel. *White shrike*.

Inhabits same place as the former.

**NÆVIUS.** Body above black; beneath cinereous; an oblong spot of white on the wing-coverts. Gmel. *Spotted shrike*.

Native of Cayenne; the bill and legs black; tail-feathers white at the tip.

**OBSCURUS.** Body above dusky-black, beneath white; over each eye a white line. Gmel. *Dusky shrike*, Lath.

Supposed to inhabit America; in size corresponds with *L. nævius*; the bill is horn-colour; wings and tail more dusky than the body, and the legs brown.

**FUSCUS.** Above brown, beneath white; lores, tips of the secondary quill-feathers, and edges of the primary, yellowish. Gmel. *Brown shrike*, Lath.

Bill at the tip, and legs black.

**RUBER.** Red; wings and tail with ocellar spots, black at the tips. Gmel. *Red lanius, or butcher-bird of Surinam*, Bancr. *Red shrike*.

Native of Surinam.

**AMERICANUS.** Black; spot on the first quill-feathers, cheeks, and chin white; breast and belly cinereous. Gmel.

Inhabits North America.

**MINOR.** Cinereous; chin white; breast and belly rosy; front, line over the eyes, and tail black. Gmel. *Pie-grieffche d'Italie*, Buff.

Native of Italy, Spain, and Russia, and resembles the grey shrike.

**MELANOCEPHALUS.** Bill, head, and chin black; body olive above, beneath paler; tail with a broad black band, at the tip yellow. Gmel. *Black-headed shrike*, Lath.

Length six inches, the legs dusky; and inhabits the South Sea islands.

**BRACHYURUS.** Head above rusty grey; eye-brows white; a black band from between the eyes to the ears; body above cinereous, grey, beneath yellowish-white; tail rounded. Pallas. *Short-tailed shrike*.

Size of the red-backed shrike; wings blackish; tail-feathers ten, brown-grey, and, except the middle ones, white at the tip. Native of Hungary.

**BOULBOUL.** Black; breast and belly tinged with cinereous; wings brown, with two white bands. Lath. Ind. Orn. *Boulboul shrike*.

Size of the field-fare; bill and legs yellow. Inhabits India.

**PHENICURUS.** Body above reddish-grey, beneath yellowish-white, tail long, rounded, and with the rump bright red; orbits crossed by a black band. Pallas.

Inhabits rocky places on the river Onon; size of the last.

**DOLIATUS.** Tail rounded; body closely varied with black and white lines. Linn. *Pied shrike*.

Native of Cayenne; the length six inches and a half; bill dusky, claws and legs brown; feather on the hind head long, and when erected form a crest; wings and tail with transverse white spots.

**FAUSTUS.** Grey, beneath ferruginous; a white line between the eyes; tail rounded. Linn. *Amœn. Acad.*

Size of the field-fare; bill and legs pale; wings rounded; quill-feathers brownish, grey at the edges, tail brown, and all marked with light brown decussating lines.

**LANKA,** in *Geography*, a position of some importance, referring both to the science and history of the Hindoos. It is the generally received opinion, that Lanka is Ceylon; but in a note of the *Ayin Acbaree* (vol. iii. p. 36, Calcutta ed.) it is asserted, that Lanka is not Ceylon, but a place determined by the intersection of the equator and the meridian of Delhi, answering to the southern extremity of the Maldevy islands. "Indeed," the note continues, "there are many reasons for concluding Lanka to have been part of the Taprobane of the ancients, and that Taprobane, or more properly Tapobon, which in Sanscrit means the wilderness of prayer, was a very large island, including the whole, or the greater part, of the Maldevy islands, which have since been destroyed by inundations. This agrees very well with Ptolemy's description, and his island of monies seems to relate to those of the Ramayana." See *RAMAYANA* and *TAPROBANA*.

On this note it is observed, in the *Hindoo Pantheon*, p. 328, whence this article is chiefly taken, that therein is an avowed obscurity, and an exiling error somewhere; for that many arguments, if not proofs, may be adduced in support of the identity of Lanka and Ceylon, and perhaps Taprobane. Lanka was the theatre of Rama's exploits against its tyrannical king Ravana, whose name is indifferently pronounced Ravan, Raban, Rabou, &c. nor can there be much

much doubt of the island that we now call Ceylon having formed a part, at any rate, of that theatre, which might in former times have been of greater extent than that island is at present.

It is said, that in Sanscrit books Ceylon is called Tapa Rawan; Tapa or Tapu, in that language, meaning an island, and it may be indifferently pronounced Taporaban, or indeed, in common discourse, Taproban, or Taprobane. Much stress is not perhaps to be laid on conjectural etymology, but it may be observed, that many names of places and things on Ceylon, and in its neighbourhood, correspond with the nomenclature of the Ramayan. In the fifth volume of the Asiatic Researches is an interesting account by the Hon. Mr. Duncan, of that extraordinary traveller Purana-Puri, who notices on Ceylon a lake called the "tank of Ravan or Raban (the *b* and *v* being pronounced indifferently in various parts of India), from whom this tapu, or island, may probably have received its ancient appellation of Taprobane (*i. e.* the isle of Raban): here also is a place called Sita Kooda, or the pool of Sita, where Rama is related to have left his wife Sita, on the occasion of the war with the ravisher Ravan." (See SITA.) In the poetical hyperbole of the Hindoos, the tears shed by Sita, in her lamentation for her lord's absence and her own captivity, are said to form this kooda, or pool, still called by her name.

Between Ceylon and the continent is a series of rocks, some of which appear above water, admitting a passage only in fine weather to vessels of small burden. This in our maps is called Adam's bridge, the Romish missionaries having placed the garden of Eden in Ceylon, and fancied this bridge his only mode of exit. In Hindoo writings this is called Rama's bridge, and in the Hindoo Pantheon a plate is given of the building of it by Rama's monkey-general Hanuman, and his Simian associates. The conspicuous part acted by those animals, in the wars of the Ramayan, reminds us strongly of Ptolemy's island of monies, and offers another mark of identity. On the continent of India, Ceylon is to this day popularly believed to be inhabited principally by monies, lions, and monsters; one of its names, Singala dwipa, whence Seilan diva, Selendeb, Ceylon, &c. means the country of lions. See CEYLON.

In Hamilton's account of the East Indies (vol. i. p. 142.) a map of the peninsula has one of the Maldive islands marked Hunnamandow, evidently the same with Hanuman devy, as it would be more correctly pronounced, meaning the island of Hanuman; and this name occurring conspicuously on those islands gives room for imagining a connection between them and the history of Rama, Ravana, Lanka, &c. that would be farther developed if we had more knowledge of the islands in question; a knowledge that might be abundantly obtained by a permitted admission to the records at the India House. Hamilton calls the southern extremity of the peninsula Ram's point; this, in our more modern maps, is named Cape Comorin, and it has derived this name, which is cited by Ptolemy, from a celebrated temple of the goddesses Isa, or Devi, in her character of Kumari, or the Virgin. These are names of *Parvati*, which see. Rami is another of her names, and the temple, which is generally imagined to be in honour of Rama, the avatara or incarnation of Vishnu, may perhaps originally have been dedicated to Rami, whatever rites may now obtain there: a point that we are uninformed on; and shall offer no more thereon in this place than the remark that the rites of the virgin goddess Kumari, (whose magnificent temple under the name of Ramiswara, or Ramisferam, at the southern extremity of the promontory of India, is still a much venerated shrine, and of great resort by pilgrims,) have a striking analogy with those of the Taurican

Diana, a virgin goddess also, whose temple similarly occupied the southern promontory of the Taurican Cheloneusis. See RAMI and RAMISWARA.

The first meridian of the Hindoo astronomers passed through Ujjeini (*Oojin*, which see) and Lanka; the latter cannot therefore be Ceylon if confined to its present extent, for Oojin lies in about 76°, and the westernmost part of Ceylon in 80° call of Greenwich. This difficulty seems reconcilable only by allowing what is asserted in India, that Ceylon was formerly of greater extent than at present, and it is said, that appearances between that island and the Maldivys, or Maldivas, as well as between it and the continent, justify the belief of their having once joined. See *As. Ref.* vol. iii. p. 44, also CEYLON and MALDIVES in this work.

LANKAYT', a small island near the W. coast of Celebes. S. lat. 4 57'. E. long. 119° 12'.

LANKE', a lake of Thibet, about 45 miles in circumference; 40 miles N. of Darmadjira.

LANMEUR, a town of France, in the department of Finisterre, and chief place of a canton, in the district of Morlaix; 6 miles N.E. of Morlaix. The place contains 2389, and the canton 13,170 inhabitants, on a territory of 182½ kilometers, in 8 communes.

LANNARIUS, in *Ornithology*, the name of a bird of the long-winged hawk kind; the *Falco lannarius* of Linneus, called in English the *lanner*, and the male *lannaret*. See *FALCO lanarius*.

LANNAS, in *Geography*, a town of Sweden, in the province of Angermannland; 35 miles N.W. of Hernofand.

LANNIERS, or LANIARDS, in a *Ship*, are small ropes reeved into the dead-men's-eyes of all the shrouds and chains. Their use is to slacken or fet taught the shrouds. The stays also of all masts are fet taught by lanners. That rope, which fastens the stopper of the halliards to them, is called also a lannier; and the term is generally applied to any short piece of cord or line, fastened to several machines in a ship, and serving to secure them in a particular place, or to manage them more conveniently; such are the laniards of the gun-ports, the laniard of the buoy, of the cat-hook, &c.

LANNION, in *Geography*, a town of France, and chief place of a district, in the department of the Northern Coasts. The place contains 3132, and the canton 14,983 inhabitants, on a territory of 105 kilometers, in 9 communes. N. lat. 48° 44'. W. long. 3° 22'.

LANNOY, a town of France, in the department of the North, and chief place of a canton, in the district of Lille; 6 miles E.N.E. of Lille. The place contains 923, and the canton 13,933 inhabitants, on a territory of 97½ kilometers, in 16 communes.

LANNSTROFF, a town of France, in the department of the Moselle, and chief place of a canton, in the district of Thionville. The place contains 338, and the canton 13,615 inhabitants, on a territory of 397½ kilometers, in 44 communes.

LANO, a lake of the island Mindanao, from 15 to 20 miles broad, and about 60 miles round. See MINDANAO.

LANOUAILLE, a town of France, in the department of the Dordogne, and chief place of a canton, in the district of Nontron. The place contains 458, and the canton 9581 inhabitants, on a territory of 235 kilometers, in 10 communes.

LANPENCKEN, a town of Prussia, in the palatinate of Culm; 14 miles N. of Strasburg.

LANSARD, a town of Persia, in the province of Mazanderan,

zanderan, on the coast of the Caspian sea; 10 miles W. of Tcherabad.

**LANSINBURG**, New City, a town of America, in the township of Troy, county of Rensselaer, New York, pleasantly situated on the E. bank of Hudson's river, opposite to one of the mouths of the Mohawk; containing about 250 houses, a brick church for the joint use of the Dutch and Presbyterians, a court-house, gaol, and an academy, incorporated in 1796. The library of this town was incorporated in 1775; 9 miles N. of Albany. N. lat. 42° 46'. W. long 73 34'.

**LANS-LE-BOURG**, a town of France, in the department of Mont Blanc, and chief place of a canton, in the district of St. Jean-de-Maurienne. The place contains 874, and the canton 4675 inhabitants, on a territory of 742½ kilometres, in 7 communes.

**LANSMANS**, a town of Norway; 116 miles N. of Bergen.

**LANSPESSADE**, in *Military Affairs*. See ANSPESADE.

**LANSQUENET** is the name of a game at cards.

**LANTA**, in *Geography*, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the district of Villefranche; 9 miles E. of Toulouse. The place contains 1455, and the canton 5669 inhabitants, on a territory of 117½ kilometres, in 16 communes.

**LANTA-LEPTEN**, a small island on the coast of China, near the harbour of Macao.

**LANTANA**, in *Botany*, supposed to be derived from *lentus*, flexible, as in that sense originally applied to the Plant Mealy Tree, *Viburnum Lantana*. It is now used generically for a set of plants, rather agreeing with that in general aspect, than in this peculiar quality.—Linn. Gen. 316. Schreb. 413. Willd. Sp. Pl. v. 3. 315. Mart. Mill. Dict. v. 3. Art. Hort. Kew. ed. 1. v. 2. 350. Juss. 109. Lamarck Illustr. t. 540. Gært. t. 56. (Camara; Plum. Gen. 31. t. 2.)—Class and order, *Didymnia Angiospermia*. Nat. Ord. *Personata*, Linn. *Vitacea*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, very short, cohering, tubular, with four slight teeth. Cor. of one petal, nearly regular; tube cylindrical, slender, longer than the calyx, somewhat oblique; limb flat, unequally and bluntly four-cleft. Stam. Filaments four, extremely minute, situated in the middle of the tube, slender, two of them a little above the rest; anthers roundish. Pist. Germen superior, roundish, style thread-shaped, short; stigma bent backward like a hook, pointed downwards, and attached obliquely, as it were, to the top of the style. Peric. Drupa roundish, of one cell. Seed. Nut roundish, somewhat pyramidal, of three cells, the lowermost of which is barren; kernels solitary, oblong.

Obs. Linnæus observes that the essential character consists in the figure of the stigma. His *L. Africana* is now separated from the rest; and called *Spielmannia*. In the genuine *Lantana* there is a many-leaved involucre, according to Linnæus, (rather to be termed a number of bractæes,) and the common receptacle of the fructification is oblong, bearing many crowded sessile flowers, mostly very unequal.

Ess. Ch. Calyx obscurely four-toothed. Limb of the corolla unequally four-cleft, flat, with an open mouth. Stigma bent back like a hook. Drupa with a smooth nut of two cells.

The species in Willdenow are 15, but professor Martyn reckons up 19. Some uncertainty attends a few, even of those defined by Linnæus, at least he suspected his *trifolia* might not be distinct from *annua*, but in this he seems to have been mistaken. Medicus, indeed, who took some pains

with this genus, appears to have described *annua* for *trifolia*, which Reichard corrected. The *L. falsifolia* of Linnæus is properly referred in Port. Kew. to *Buddlea*.

Good examples of the genus are,

*L. aculeata*. Prickly-stalked Lantana.—Linn. Sp. Pl. 874. Curt. Mag. t. 96.—Leaves ovate, somewhat heart-shaped, downy underneath. Stem prickly. Bractæes lanceolate, with a broad base.—Native of the West Indies, where it is vulgarly called Wild Sage. It is one of the most commonly cultivated in our fives, being readily propagated by cuttings, and flowering almost all the year. The stem is shrubby, more or less rough, with projecting prickles. Leaves stalked, serrated, pointed, roughish, about two inches long. Flowers bright yellow at first, then orange, numerous, in flattened heads, on simple, solitary, axillary stalks.

*L. Camara*. Various-coloured Lantana.—Linn. Sp. Pl. 874. (Camara melissæ-folio, flore variabili; Dill. Elth. 65. t. 56. f. 65.)—Leaves ovate, rough on both sides. Stem unarmed. Bractæes ovate, small, downy.—Native of South America; an old inhabitant of our fives. The flowers are changeable in colour, being, at first opening, yellow, then orange, finally scarlet; which becomes dull or brownish as they fade, not purple, as in some other species.—Several of this genus are described under the Brazilian name of *Camara*, in Piso and Marcgrave. The word is now adopted by the Portuguese, as it seems, in a medical sense, suggested by the colour of the flowers, for the dysentery.

*L. annua*. Annual Lantana.—Linn. Sp. Pl. 874. Curt. Mag. t. 1022.—Leaves ovate, downy beneath. Stem unarmed, hairy. Spikes oblong. Bractæes ovate, pointed.—Native of the West India islands, as well as of the Spanish Main; rarely preserved long in our fives, to which it has from time to time been introduced, because the seeds do not ripen well here, and the plant, though shrubby in habit, is properly annual. The leaves are broad, almost heart-shaped. Flowers in oblong, stalked, axillary spikes, very beautiful. When cultivated in an airy light stove, being bright reddish-purple, or pink, with a white ring and yellow eye.

*L. trifolia* of Linnæus differs from the last very widely in appearance, and has the leaves growing three or four together, ovate, much more finely crenate; the heads of flowers rounder; bractæes larger, and more obtuse.—Plumier's Icones, t. 70, quoted for this, is not at all like the Linnæan specimen, but appears to be merely a three-leaved variety of the *annua*.

*L. nivea*. Venten. Malmaif. t. 8, appears to us a white-flowered variety of *L. aculeata*; at least we can discover no specific distinction, unless the flower-stalks, growing in pairs at each leaf, should prove to be such. This is a native of the West Indies, and was sent to the garden of Malmaison by Messrs. Lee and Kennedy. The leaves are of a full bright green; flowers snow-white, copious about the ends of the branches.

Jacquin has a few new or doubtful species in his Hortus Schoenbrundensis; amongst others

*L. hexandralacea*, t. 361. Willd. n. 11. White small-flowered Lantana.—Leaves elliptic-lanceolate, serrated, downy beneath. Stem roundish. Heads of flowers cylindrical, shorter than the leaves. Bractæes nearly orbicular.—Willdenow, who first described this, and Jacquin, had it in their gardens, without knowing whence it came. We have a native specimen, gathered by Dombey, in moist situations at Lima. It is *shrubby*, with round, slender, roughish branches. Leaves opposite, stalked, an inch long or more, rugose; rough above; downy, with numerous, branching, prominent ribs and veins beneath; the margin sharply serrated. Flower-stalks axillary, various in length, but always

much shorter than the leaves. *Spikes* oblong, with broad, roundish, pointed *bractææ*; the *flowers* white, unequally five-lobed, turning reddish-brown in decay. The dried leaves are aromatic, with somewhat of the flavour of sage. —This species is properly placed next to *L. odorata*.

LANTANA, in *Gardening*, comprehends plants of the shrubby, exotic, green-house, and stove kinds, of which the species cultivated are the various-flowered lantana, *L. mista*; the various-coloured lantana, *L. camara*; the round-leaved lantana, *L. involucrata*; baum-leaved lantana, *L. mellicifolia*; the prickly lantana, *L. aculeata*; and the golden-flowered lantana, *L. aurea*.

*Method of Culture*.—These plants are capable of being raised by seeds and cuttings of the young branches.

With regard to the seeds, they should be sown in pots of light mould in the early spring, plunging them in a bark hot-bed. When the plants have attained some inches growth, they should be removed into separate pots of a small size, and be replunged in the bark-bed, due shade and air being given. The plants should afterwards, when they have acquired strength, be removed into an airy glass-case, or dry stove, where they may have a large share of air in warm weather, but be protected from the cold. This is necessary for the young plants, which should not the first year be exposed to the open air, but afterwards they may be placed abroad in the warmest part of the summer, and in winter be placed upon stands in the dry stove, where they will continue long in flower, and many of the sorts ripen their seeds. In winter they should be sparingly watered, as much moisture rots their roots.

And the cuttings should be planted in pots in the spring and summer months, as in May and July, and be plunged in a moderate hot-bed, due shade being given. They soon take root, and should afterwards be removed into separate pots filled with light earth, and managed in the same manner as those raised from seed.

These plants afford ornament and variety among collections of stove and green-house plants.

LANTARGUR, in *Geography*, a town of Lamjung; 42 miles N. of Gorkah. N. lat. 29 5'. E. long. 84° 18'.

LANTCHANG. See LANJAN.

LANTER-LOO, or LOO, is the name of a common game at cards.

LANTERN, or LANTHORN, a cover for a luminary, made of some transparent matter; serving to transmit the light, and, at the same time, to screen it from the wind and rain.

The word is derived from the French *lanterne*; and that from the Latin *laterena*, of *later*, I am bidden; *eo quod lucem habet interius clausam*, because the light is hidden within, say Isidore and Lambin. But according to Pezron, *laterena* comes from the Celtic *latera*, and according to Salmonius *lantern* comes from *lato*, of *fero*, because it bears a lamp or a light.

Epictetus's lantern is said to have been sold for three thousand drachmas; that of Diogenes was held in great veneration among the ancients; and that of Judas is still preserved in the treasury of St. Denis, as a very curious piece of antiquity.

Lanterns are made of glass, horn, paper, &c. Formerly they were made of the horn of a wild bull, called *urus*; which, when cut into thin laminæ, Pliny tells us, was very transparent. Those of horn were first introduced into England by king Alfred, about the year 887, in order to preserve his candle time-measurers from the wind. See LENS. And Hist. Com. vol. i. p. 45.

LANTERN, *Dark*, is a lantern with only one opening or

light, which, too, may be closed up when the light is to be entirely hid; and may be presented to the person one would see without being perceived one's self.

The ancients had their dark lanterns, but they differed from our's: they were covered with four skins, one on each side, or light, three of which were black, and only the fourth transparent. Casaubon, who gives us the description, took it from a manuscript of Julius Frontinus. These were principally used in their armies, when they were to march privately off from their enemies in the night-time.

LANTERNS are used at sieges in the night-time, upon the batteries; but these must be blind or dark lanterns. There is always great provision of them in all store-houses.

LANTERNS for ships are made of tin and glass, to light those parts of a ship where naked candles would be dangerous, such as for lighting the magazine and store rooms. Those used at the stern are called poop-lanterns, and those aloft top-lanterns.

LANTERNS, *Fest of*, in China, is a celebrated feast held on the fifteenth day of the first month; and is so called from the great number of lanterns hung out of the houses and in the streets; insomuch that it rather appears a fit of madness than of feasting. On this day are exposed lanterns of all prices, some of which are said to cost two thousand crowns. Some of their grandees retrench somewhat every day out of their table, out of their dress, equipage, &c. to appear the more magnificent in lanterns. They are adorned with gilding, sculpture, painting, japanning, &c. and as to their size, it is extravagant; some are from twenty-five to thirty feet diameter; they represent halls and chambers, and two or three such machines together would make handsome houses; so that in China they are able to eat, lodge, receive visits, have balls, and act plays, in a lantern.

To illumine them, they should have bonfires; but as that would be inconvenient, they content themselves with lighting up in them a great number of torches or lamps, which at a distance have a beautiful effect. In these they exhibit various kinds of shows to divert the people.

Besides these enormous lanterns, there is a multitude of other smaller: these usually consist of six faces or lights, each about four feet high and one and a half broad, framed in wood finely gilt and adorned; over these they stretch a fine transparent silk, curiously painted with flowers, trees, and sometimes human figures: the painting is very extraordinary, and the colours extremely bright; and when their torches are lighted, they appear highly beautiful and surprising.

LANTERN, or LANTHORN, in *Architecture*, a turret raised above the roof with windows round the sides, in order to light the apartment below. Lanterns are much more convenient than skylights; as the surface of the glass stands vertical, they are not so liable to be broken, nor so subject to the rattling noise of heavy rains and hail.

LANTERN is also used for a square cage of timber, with glass in it, placed over the ridge of a corridor, or a gallery between two rows of shops to illuminate them.

LANTERN, *Magic*, in *Optics*, the name of a machine, which, in the dark, represents various images and spectres on a wall, or other white surface, so odd and surprising, that those who are not in the secret think them the effect of magic. See MAGIC.

LANTERN-Fly, in *Ichthyology*, the English name of a fish of the foal-kind, but smaller and smoother to the touch, called in Latin *amoglossus*.

LANTERN-Fly, in *Natural History*, the name of a very singular kind of insect produced in the West Indies, and

carrying a strong light with it in the night. The structure of the trunk in this insect is of the same kind with that of the cicada; and it wants the power of making the noise for which the cicada is so famous; it belongs, according to M. Reaumur's distinctions, to that species of insect called the *prociçal*, or *prociçada*.

The glow-worm and the luminous beetles, with all the other luminous insects we are acquainted with in this part of the world, diffuse their light from a part which is near the extremity of the body, and under the belly, but the lanternfly gives it from its head. It differs also greatly in the degree of light; for this, in all the insects we are acquainted with, is very feeble; whereas in this fly it is so strong, that Mrs. Merian, who is the first that well described it, says she could read a small print in a dark night by the light that one of them gave. The head of this creature, strictly speaking, is very short, not exceeding the length of one of the rings of the body, if it be measured from its joining with the corcellet to its joining with the lantern, but if that part be accounted a portion of the head, then the head is equal in length to the whole body. This lantern is wider than it is deep, or thick, and has near its origin a large protuberance, which gives it a bunched or humped look. There are several tubercles and lines on it, of a reddish colour. The ground colour is an olive brown, and underneath it has one large rib running all the way along it, from end to end, and dividing it into two, and by the sides of that there are some others. These are all reddish, and those nearest the edges have small rows of spines running along them. Over each of the eyes there is a round granulated prominence, which seems to have been a collection of smaller eyes; and if so, the animal is supplied with the organs of vision in a different manner from all other known creatures. But there requires an examination of the creature on the spot, and while alive, in order to find out this. The upper pair of wings are not perfectly transparent, they are dotted with white in some places, and are variegated near their origin with several blackish spots. The under pair are more transparent than the upper; they are much shorter, and are broader than the others: these have each a large and beautiful round spot near the extremity, resembling that on the wing of the peacock-butterfly. The colours of the circles of these eyes are brown and olive; the last colour very bright and clear, the other very dusky and obscure. The spots are so large, that they appear very beautiful. Reaumur's Hist. Inf. vol. ix. p. 247.

**LANTERNISTS**, a name assumed by the academicians of Thouloufe.

**LANTHONY**, in *Geography*, a hamlet in the parish of Cwmoy, and hundred of Abergavenny, county of Monmouth, England, is noted for the fine and picturesque ruins of its abbey-church. These are seated in a narrow, deep valley, called "The Vale of Eurus." The surrounding hills, called Hattal, are lofty and grand, and from their steep acclivities are almost impassable for travellers. In a sequestered dale among these hills or mountains, Hugh Lacy founded a priory of canons-regular of the order of St. Augustin, about the year 1108. A very particular history and description of this abbey, and the surrounding country, with several prints, are to be found in Coxe's "Historical Tour in Monmouthshire," 4to. 1801.

**LANTIGNANO**, a town of Etruria; 13 miles S. of Pisa.

**LANTO**, a small island in the Baltic, between the island of Aland and the coast of Finland. N lat. 60° 25'. E. long. 20° 36'.

**LANTOOR**, or **BANDA**, the chief island among those called Banda islands in the East Indian sea. See **BANDA**.

**LAN-TSAN**, a river of Asia, which rises in the N. part of the Chinese province of Yun-nan, on the borders of Tibet, traverses the province from N. to S., changing its name to Kou-long; enters the kingdom of Laos, assuming the name of Mecon, and afterwards discharges itself into the East Indian sea.

**LANIGINOUS**. See **LANIGEROUS**.

**LANUGO**, in *Botany*, down; that soft, hairy woolly covering, which grows on leaves, stalks, or fruits, of divers plants.

Such is that found on the leaves of the rose-campion, and on the fruit of the peach-tree.

**LANVOLLON**, in *Geography*, a town of France, in the department of the North Coasts, and chief place of a canton, in the district of St. Brieuc; 11 miles N.W. of St. Brieuc. The place contains 1123, and the canton 15,296 inhabitants, on a territory of 147½ kilometres, in 12 communes.

**LANUVIUM**, in *Ancient Geography*, a town of Latium, in Italy, S.E. of Rome, and S.E. of Alba, situated on the brow of a mountain near the Appian way. Milo, who killed Clodius, was born in this town. Here was a temple of Juno, worshipped under the three names of Sospita, Moneta, and Regina.

**LANYARDS**, or **LANIARDS**, on *Ship-board*. See **LANNIERS**.

**LANZA**, in *Geography*, a town of Spain, in Navarre; 8 miles N. of Pamplona.

**LANZETTI**, in *Biography*, an eminent performer on the violoncello, during the early part of the last century. He was in England about the year 1740; but returned to Bologna, the place of his nativity, where he ended his days.

**LANZO**, in *Geography*, a town of France, in the department of the Po, on the Stura; 11 miles N.W. of Turin.

**LANZONI**, **JOSEPH**, in *Biography*, a physician, was born at Ferrara on the 26th of October 1663. From his early childhood he exhibited a strong inclination for literature, which his parents indulged, by obtaining for him the best masters. He distinguished himself particularly in the schools of philosophy and of medicine, and graduated in both these sciences in the year 1683. In the following year, at the age of 21, he was appointed ordinary professor, and displayed talents which did honour to the university of Ferrara, during the long period in which he filled that office. He died in February 1730, at the age of 66.

Lanzoni acquired a high reputation by the success of his practice, and obtained the confidence and esteem of many illustrious personages. His attachment to study increased with his years; and every moment, in which he was not employed in the duties of his profession, was devoted to literature, philosophy, or antiquarian research. His character as a physician and philosopher, indeed, ranked so high, that if any question upon these subjects was agitated in Italy, the decision was commonly referred to him. He was distinguished likewise by his genius in Latin and Italian poetry; and he was the restorer and secretary of the academy of Ferrara, and a member of many of the learned societies of his time. He left a considerable number of works, both published and in manuscript, in the execution of which he has been reproached with carelessness and incorrectness. It will be sufficient to state, that a collection of his works, as well of those published by himself as of his manuscripts, was

printed at Laufanne, in 1738, in 3 vols. 4to., with an account of his life, under the title of "Josephi Lanzoni, Philosophiæ et Medicinæ Doctoris, in Patria Universitate Lectoris primarii, &c. Opera omnia Medico-physica et Philologica." Eloy. Dict. Hist.

LAO, in *Geography*, a town of the island of Cuba; 25 miles W. of Havana.

LAOCOON, in the *History of the Arts*, is a celebrated monument of Greek sculpture, executed in marble by Polydorus, Athenodorus, and Agesander, the three famous artists of Rhodes. This remnant of antiquity was found at Rome, in the ruins of the palace of Titus, in the beginning of the sixteenth century, under the pontificate of Julius II., and since deposited in the Farnese palace. Laocoon, the priest of Apollo and Neptune, is here represented with his two sons, with two hideous serpents clinging round his body, gnawing it, and injecting their poison. Virgil has given us the following description of the fact:

"Serpens amplexus uterque  
Implicat & miseris moriuf depascitur artus:  
Corrumpunt, spirisque ligant ingentibus, & jam  
Bis medium amplexit, bis collo squamea circum  
Terga dati, superant capite, & cervice altis."

This statue exhibits the most astonishing dignity and tranquillity of mind, in the midst of the most excruciating torments. Pliny says of it, that it is "opus omnibus, picturæ & statuarie artis, preferendum" Lib. xxxvi. c. 5.

LAODICEA, in *Ancient Geography*, a town of Asia, in Caria, called "Laodicea ad Lycum," not that it was near this river, which passed to the west of it, and received, to the north of Laodicea, the river Caprus, which traversed the town, and the Apocys, which was cast of it. A little to the south of Laodicea was Hierapolis. This town was more anciently called *Diospolis*, and afterwards *Rhaas*. It was re-established by Antiochus, who gave it the name of his wife; and it became one of the most considerable and rich towns of Asia Minor.

LAODICEA *Cabiofa*, a town of Asia, in Syria, situated eastward near mountains, west of Emesa and the river Orontes. It was favoured by the emperor Severus, on account of its attachment to the interests of the empire. By way of distinction, it was called "Laodicea ad Libanum."

LAODICEA *ad Mare, Latikea*, a maritime town of Syria, situated on an eminence, near the sea-coast. Strabo says, that its environs furnished abundance of wine. In its present ruins may be seen columns of porphyry and granite, an aqueduct, and a triumphal arch, supported by columns of the Corinthian order. About a stadium west of this town are the ruins of a fine port, artificially constructed in the form of an amphitheatre, and capable of containing a considerable fleet.

LAODICEA *Combysta*, a town of Asia, in Lycaonia, east of Philomelium; supposed to have derived its name from traces of ancient volcanos.

LAODICEA, a town of Asia, on the confines of Media and Persia Propria.—Also, a town of Mesopotamia, according to Pliny; being one of the six towns built by Seleucus under this name.—Also, a town of the Peloponnesus, in the Megapolitide, according to Polybius and Thucydides; the fame with the *Ladonea* of Pausanias.

LAO-KUN-TIM, in *Geography*, a town of Chinese Tartary; 50 miles S.W. of Ning-yuen-tcheou.

LAON, a town of France, and chief place of a district, in the department of the Aisne; and before the revolution, the capital of a small country called Laonnois, and the see

of a bishop, who was a duke, and the second peer of France.—The place contains 6691, and the canton 14,958 inhabitants, on a territory of 215 kilometres, in 27 communes. N. lat. 49° 34'. E. long. 3° 42'.

LAOS, in *Ancient Geography*, a town of Italy, in Lucania, west of Bratium, and near it. It was situated on a small gulf, distant 400 stadia from the town of Hyole. It was founded by a colony of Sybarites.

LAOS, in *Geography*, a country of Asia, bounded on the north by the Chinese province of Yun-nan, on the east by Tonquin, on the south by Cambodia, and on the west by Siam and Ava. Kæmpfer represents it as a powerful state, surrounded by forests and deserts, and of difficult access by water, because the river is full of rocks and cataracts. The soil is represented as fertile in rice, and the merchants of Cambodia were furnished from hence with the best benjoin and lacca. Exquisite musk is also obtained from Laos, with some gold and rubies; and the rivers supply the fresh water mya, which yields pearls. The religion and manners of the people resemble those of Siam; but in personal appearance they are like the southern Chinese. In Kæmpfer's time, the chief towns were Landjan, or Lantchang, and Tsiamaja, whence the people take the name of Landjanese, to which, in modern maps, is added Sandepora. Duhalde has given some account of this country, the capital of which is denominated Mohang-Lang by the Chinese. (See MOHANG-LANG.) Laos, in his time, was tributary to Ava; but its chief trade was with the Chinese. It is said to have mines of gold, silver, and copper; near the capital is one mine of rubies; and its emeralds are of large size. The articles exported are tin and sulphur, (perhaps cinnabar or realgar,) cotton, tea, and sapan or Brasil wood. The chief river is denominated Meinan Krong, which passes through Cambodia; and its different branches bear different appellations. This grand stream, in Mr. Dalrymple's map of exterior India, is called the Kion-Long, or Maykaung. Mr. Arrowsmith derives it from the Tibetan Alps, where it is called the Satchou, and by D'Anville the Lantfangkiang. Of this country Turpin, cited by Pinkerton, (Geog. vol. ii.) has given the most recent account. The name Laos, he says, denotes 1000 elephants, with which animals the country abounds. The climate is so temperate, and the air so pure, that men are said to retain their health and vigour, in some instances, to the age of 100 years. The flat part of the country resembles Siam, but the soil on the east bank of the river is more fertile than that on the west. The rice is preferred to that of other oriental countries. The ivory is beautiful, but the horn of the rhinoceros is particularly esteemed from a superstitious notion, that the possessor, who keeps it, insures his felicity. The fields, abounding with flowers, afford food for numerous swarms of bees, which supply excellent wax and honey. In the mountains are found rich mines of tin, iron, and lead; but gold and silver are explored in the sands of the rivers. Musk, says this author, is not a product of the country. Before the irruption of the Tartars, the Chinese carried on a considerable commerce with Laos; exchanging their velvets, silks, cottons, and porcelain, for ivory, opium, and medicinal plants. In the province of Laos, whence the kingdom derives its name, is a deep mine, which furnishes rubies and beautiful emeralds, one of which, in the royal treasury, is said to be as large as a common orange. The inhabitants of this kingdom are celebrated for their honesty and fidelity; and so anxious are they to maintain their reputation in this respect, that if a traveller be robbed, the nearest town or village is obliged to indemnify him. At the

same time, they are indolent and luxurious, and addicted to the study and practice of magic. The army of Laos is estimated by Turpin at 500,000 combatants; but he adds a circumstance which somewhat affects his credibility, that a numerous army might be raised of men who have lived a century. The people of this country are not very distinguished for their sobriety and temperance, as they eat daily four repasts of rice, fish, and the flesh of the buffalo; the buffalo and venison being common in their markets. Marriages are easily contracted, and no less easily dissolved; and the rich entertain many concubines. A funeral resembles a festival; and a sum of money is deposited in the tomb, which is circulated, after a certain period, by the priests. The commerce of this country was chiefly carried on in former times with Siam; but after the irruption of the Birmas, it passed to Pegu; at a later period, the trade of Laos has been transferred to Cambodia. The inhabitants of Laos boast that the Siamese borrowed the art of writing on palm-tree leaves from them. The tongue and characters are the same; but it is said, that the Laotian cannot pronounce the letters L and R.

The ancient worship of these people is said to have been directed to one God, the creator of all, who was only to be pleased by the exercise of virtue, and not by sacrifices, ceremonies, and the observance of certain days. But the purity of their faith has been corrupted by their intercourse with the Chinese. They believe in regular renovations of the universe; and that our earth has attained the age of 18,000 years. Polygamy is one of the promised joys of paradise, and the women are assured, that if they lead a virtuous life, they shall be changed into men. The priests take comfort under the privations of celibacy, from a persuasion which they indulge, that in another world they shall be able, by the privilege of their order, to create females at their pleasure. Some of their ceremonies, like those of Thibet, seem to have been derived from the Nestorian Christians. To the rich they sell dispensations and pardons; while the poor alone are condemned to perpetual misery.

The king of Laos is said to be an absolute, independent prince, and to acknowledge no superior, either in temporal or spiritual concerns. In him is vested the whole property of lands, and he disposes at pleasure the effects of his subjects; nor can any family in the kingdom inherit or possess any thing left them by will.

LAOUR, a town of Hindoostan, in Bengal; 40 miles N.W. of Silhet. N. lat. 25° 7'. E. long. 91° 20'.

LAPA, one of the Sooloo islands. N. lat. 5° 25'. E. long. 120° 42'.—Also, a town of Circassia, on the Cuban. N. lat. 44° 50'. E. long. 58° 34'.

LAPACTICS, from *λαπαξ*, *I evacuate*, a term used by the old writers in medicine to express such things as purged by stool, or at least gently loosened the belly. It was sometimes applied to the cathartic medicines, and sometimes to those foods which were of this tendency.

LA PALISSE, in *Geography*. See *La PALISSE*.

LAPAROCÉLE, (from *lapara*, the flanks, and *κελειν*, a tumour,) a term, in *Surgery*, denoting a swelling, or hernia, at the side of the belly.

LAPARY, in *Geography*, a town of Hindoostan, in Allahabad; 7 miles N. of Jiohpour.

LAPATA, a chain of mountains in Africa, called the "Backbone of the World," extending from N. to S. about 600 miles. S. lat. 12° 30' to 20°. E. long. 27 to 33°.

LAPATHIOS, in *Ancient Geography*, a town of the island of Crete, on the northern coast.

LAPATHUM, in *Botany*, *λαπαθιον* of the Greeks, from *λαπαξ*, or *λαπαζειν*, to evacuate, alluding to its medical

qualities; a general name for various plants, mostly of the Dock kind, belonging to the *Rumex*, *Rheum*, *Chenopodium*, or *Spinachia* of Linnæus.

LAPATHIUS, LAPITO, in *Ancient Geography*, a town on the N. coast of the island of Cyprus, at the bottom of a small gulf, formed to the N.W. by the promontory called Cron'm'on. It was founded by the Lacedæmonians as a place of arms, and a port.

LA PAZ, in *Geography*. See *La PAZ*.

LAP-DOG, called also *malteux*, or *fotor*, and by Dr. Caius, in his System of British Dogs, the Spanish gentle or comforter, is a species of the most generous kind of dogs. See *Dog*.

Mr. Pennant observes, that the Maltese little dogs were as much esteemed by the fine ladies of past times as those of Bologna are among the moderns. Old Hollingshed is ridiculously severe on the fair of his days for their excessive passion for these little animals; which is sufficient to prove it was in his time, *viz.* in the reign of queen Elizabeth, a novelty.

LAPEYROUSIA, in *Botany*, received its name from the Abbé Pourret of Narbonne, in honour of M. Picot Lapeyrouse, author of a splendid botanical book on the genus *Saxifraga*, and who has paid great attention to the natural history of the Pyrenées. Thunberg has applied the same name to a Cape plant, *Osmites calycina*, Linn. Suppl. 380, which he separates in his *Prodrum*, p. 163, from *Osmites*, saying the receptacle is naked, and the corolla discoid. In this Willdenow follows him, Sp. Pl. v. 3, 2260. On examining the original Linnæan specimen, marked as communicated by Thunberg himself, we find ourselves obliged to declare that neither of these characters holds good. The lanceolate scales of the receptacle are numerously apparent between the florets of the disk, and the ligulate florets of the radius are no less visible within the calyx; though indeed the large membranous inner scales of the latter equal them in length. The habit of the shrub, too, is sufficiently like other species of *Osmites*. Such being the state of the case, and the right of priority moreover in favour of Pourret, we adopt his *Lapeyroufia* in preference.—Ker (Gawler) in Curt. Mag. v. 16, 595, and v. 3, 1246. Ann. of Bot. v. 1, 237. Dryand. in Ait. Hort. Kew. ed. 2. v. 1, 110.—Claf. and order, *Triandria Monogynia*. Nat. Ord. *Enstatz*, Linn. *Irides*, Jussl.

Gen. Ch. *Cal.* Spatha inferior, shorter than the corolla, of two, rarely but one, folded valves. *Cor.* of one petal, superior, valver-shaped, nearly or quite equal; tube long, slender, triangular, its throat a little enlarged; limb in six deep segments, shorter than the tube, either quite equal and regular, or slightly irregular, in the former case horizontal, in the latter inclining. *Stam.* Filaments three, inserted into the mouth of the tube, rather shorter than the limb, various in direction; anthers oblong, incumbent. *Pist.* Germen inferior, roundish; style capillary, as long as the stamens; stigma three, linear, deeply divided, spreading and recurved, downy. *Peric.* Capsule membranous, three-lobed, or with three compressed dilated angles, of three cells and three valves, with very short partitions. *Seeds* numerous, in two rows, nearly globose, or slightly angular from pressure.

Eff. Ch. Spatha of one or two folded valves. Corolla valver-shaped; limb in six deep segments, shorter than the tube. Stigmas three, deeply divided. Capsule membranous, triangular, with many globular seeds.

The most correct enumeration of the species of this genus, previously, by other writers, confounded with *Isia*, *Gladiolus*, or *Galaxia*, is given by Mr. Ker, in Curt. Mag. v. 31, above quoted as follows.

1. *L. corymbosa*. Level-topped Lapeyroufia. Curt. Mag. t. 595. (*Ixia corymbosa*; Linn. Sp. Pl. 51. Willd. Sp. Pl. v. 1. 199. Jacq. Ic. Rar. t. 288. *I. crispifolia*; Andr. Repot. t. 35.)—Flowers regular, corymbose; tube scarcely longer than the limb. Stamens widely spreading. Stem two-edged, somewhat branched.—Native of the Cape of Good Hope, from whence it was introduced by Mr. Masson, in 1791. It flowers in the green-house in May and June, and requires to be kept dry when out of blossom. The *bulb* is conical, with a broad base. *Stem* about a foot high, zig-zag, somewhat branched, leafy, corymbose. *Leaves* vertical, clasping the stem with their broad sheathing base. *Flowers* numerous, not an inch wide, blue, generally with a white itary central mark, bordered with darker blue, not very unlike another beautiful Cape plant, *Rocella ciliata*, however different in botanical affinity. Sometimes they vary to white.

Mr. Ker is now convinced that *Ixia fissigata*, Lamarck. Dict. v. 3. 337, is not specifically distinct from the above.

2. *L. falcata*. Falcate Lapeyroufia.—(*Gladiolus falcatus*; Thunb. Gladiol. n. 4. t. 1. f. 3.)—Flowers slightly irregular, racemose; tube twice as long as the limb. Stem compressed. Leaves nearly radical, falcate, obovato-lanceolate. From the same country; discovered by Thunberg. The *stem* is but five or six inches high. *Leaves* one or two. *Flowers* five or six, blue. *Spatha* of two valves.

3. *L. fasiculata*. Fasciculate Lapeyroufia.—(*Ixia heterophylla*; Vahl. Enum. v. 2. 57. *Galaxia plicata*; Jacq. Ic. Rar. t. 292.)—Radical leaves sword-shaped, erect; floral ones crowded, recurved, undulated, obtuse, longer than the clustered flowers. Corolla regular; tube above twice as long as the limb. *Spatha* of one valve.—Native of the Cape of Good Hope. The *stem* is very short. The *flowers* are clustered at its summit, white, with narrow equal segments, and remarkable for being encompassed with crowded floral leaves, which are longer than themselves, recurved, undulated and obtuse. The *foliage* is glaucous. Radical leaves few, long, erect, sword-shaped and acute.

Vahl and Ker appear to have adopted this species from Jacquin, and they both cite his t. 291, and instead of 292, apparently after Willdenow in Sp. Pl. v. 1. 199, quoted by Ker 159. Thus erroneous references accumulate, for want of turning to the original authorities.

4. *L. fissifolia*. Split-leaved Lapeyroufia.—(*Gladiolus fissifolius*; Jacq. Ic. Rar. t. 268. Vahl. Enum. v. 2. 107.)—Leaves deeply split, and clasping the stem at their base; with a short sword-shaped point; floral ones rounded. Spike leafy. Corolla somewhat irregular, drooping; tube thrice as long as the limb.—Received from the Cape of Good Hope by Messrs. Lee and Kennedy, with whom it flowered in Sept. 1809. Mr. Masson, however, is recorded as having sent the same to Kew in 1791. The leafy *spike* is peculiar, as well as the long deep fissure of the *stem-leaves*. The *flowers* are purplish, fragrant, varying in the size and colours of their limb.

5. *L. anceps*. Sword-leaved Lapeyroufia.—(*Gladiolus anceps*; Linn. Suppl. 94. Jacq. Ic. Rar. t. 269.)—Leaves sword-shaped, decurrent, toothed at the outer edge. Stem corymbose, spreading. Corolla irregular; tube thrice as long as the limb.—Native of the Cape. This appears to be the original species on which Pourret founded the genus, in the Memoirs of the Society of Thoulouse, vol. 3. It differs from the last in its branching corymbose *stem*, winged with the narrow, decurrent, toothed bases of the perfectly sword-shaped and vertical *leaves*. The *flowers* vary with different shades of blue, and have a very long tube. The *floral leaves* are either large, with toothed or crisped edges,

as Jacquin represents them; or small and nearly smooth or even.

6. *L. flenoides*. Campion-flowered Lapeyroufia.—(*Gladiolus flenoides*; Jacq. Ic. Rar. t. 270. Vahl. Enum. v. 2. 106. Willd. n. 33.)—Leaves linear-sword-shaped, entire; floral ones as long as the rest. Corolla irregular; tube five times as long as the limb, erect.—Native of the Cape, and, as it seems, known only to Jacquin, who has named it very happily from the aspect of the *flower*, which is red, with a spot of yellow at the base of three of the segments, all on one side. The *stem* is about a span high, branched from the bottom, and clothed with linear, glaucous, grassy leaves, from several of the uppermost of which the *flowers* proceed, and their white tube is about as long as the corresponding leaf, straight and rather tumid in its upper part.

Two other species are indicated as doubtful by Mr. Ker, *Gladiolus brazeatus* and *G. Fabricii* of Thunberg and Vahl, which are suspected to be possibly not distinct from *L. fissifolia*, or from *anceps*.

LAPPIORD, in *Geography*, a town of Sweden, in a bay of the gulf of Bothnia; eight miles S. of Christianstad.

LAPHAO, a town on the N. coast of the island of Timor, inhabited by Portuguese or their descendants, situated at the bottom of a bay, and containing a church and about 60 houses; the inhabitants are of a copper colour, with black hair; they carry on some trade with Batavia; and this port is visited by some Chinese junks and vessels from Goa, but the port is safe only from March till August; at other times the hurricanes render it insecure.

LAPHIATI, in *Zoology*, the name by which the people of Lemnos call a species of serpent, supposed by Bellonius to be the same with the elaps, or elaphis, of the ancients.

LAPHYSTIUS, in *Ancient Geography*, a mountain of Bœotia, 20 stadia from Coronna. It had a certain district consecrated to Jupiter Laphystius, in which there was a marble statue of this deity. Hercules Charops had also a temple at a little distance from it. Pausanius, l. ix. Bœotic. c. 34.

LAPIDARY, LAPIDARIUS, an artificer, who cuts precious stones. See GEMS.

The art of cutting precious stones is very ancient; but, like other arts, its original was very imperfect. The French have succeeded in it the best; and the lapidaries of Paris, who have been a corporation since the year 1290, have carried it, especially in cutting of diamonds called brilliants, to a very great perfection, but not superior to that of the English.

There are various machines used in the cutting of precious stones, according to the quality of the matter to be cut: the diamond, which is extremely hard, is cut and formed on a wheel of soft steel, turned by a kind of mill, with diamond dust tempered in oil of olives; and this serves to polish them as well as to cut them.

Oriental rubies, sapphires, and topazes, are cut and formed on a copper wheel, with oil of olives, and diamond dust: they are afterwards polished on another copper wheel with tripoli and water.

Emeralds, hyacinths, amethysts, garnets, agates, and other stones less hard, are cut on a leaden wheel, with flint and water, and polished on a tin wheel with tripoli.

Turquois, of the old and new rock, lapis girafol, and opal, are cut and polished on a wooden wheel with tripoli.

LAPIDARY is also used for a virtuoso skilled in the nature, kinds, &c. of precious stones; or a merchant who deals in them. See GEMS.

LAPIDARY *Style*, denotes the style proper for monumental or other inscriptions.

This is a kind of medium between prose and verse; the jejune and the brilliant are here equally to be avoided. Cicero has preferred the rules of it: "Accedat oportet oratio varia, vehement, plena spiritus. Omnium sententiarum gravitate, omnium verborum ponderibus, est utendum."

The lapidary style, which was lost with the ancient monuments, has been retrieved, at the beginning of this age, by count Emanuel Teforo: it is now used variously at the beginning of books; and even epistles dedicatory are composed in it, of which we have no example among the ancients.

LAPIDES PICTI, in *Natural History*, a term used by Languis, to express such stones as are found with the delineations of fishes, trees, and shells, as well as leaves of ferns and other plants, very perfectly representing the things themselves, but scarcely at all standing out above the surface of the stone, and having in themselves scarcely any thickness. It is very evident, that the bodies represented are not here, in reality, but the whole configuration is owing to the natural veins of the stone, and the coalescence of the several small masses of which each large stone is composed, and to the vapours from within the earth, getting into the natural fine cracks in the stones, and tinging their sides with blackness.

LAPIDESCENT, any thing which has the faculty of petrifying, or turning bodies to a stony nature.

Naturalists speak of a lapidescent principle, a lapidescent spirit, a lapidescent juice, &c

LAPIDESCENT *Waters*, or *Springs*, are such as, having stony particles dissolved and swimming in them, do deposit the same on wood, leaves, and other bodies immersed therein; which, being incruited herewith, are commonly mistaken for petrifications.

LAPIDIFICATION, in *Chemistry*, an operation where-by any substance is converted into a sort of stone.

Lapidification is practised in metals, fixed salts, and salts of plants.

The term is also used for the making of artificial stones.

LAPIN, in *Zoology*, the Rabbit. See LEFUS *Cuniculus*.

LAPIS, in the general sense. See STONE.

LAPIS *Arabicus*, in the *Natural History of the Ancients*, the name of a stone of a fine white colour, resembling the purest ivory; and which, though naturally of a firm, solid, and compact texture, yet, when burnt, became light, porous, and spongy, and assumed the figure and appearance of a pumice; and was used like it in the compositions of the ancient physicians for cleaning the teeth.

LAPIS *Ærofus*, in *Natural History*, a name given to several sorts of stones, and other fossils, which had lain in the neighbourhood of copper-mines, and been impregnated with particles of copper, though not in a sufficient degree to be thought worthy the name of copper ores. See PYRITES.

The same sort of stones were also sometimes called *chalchites*, which made some confusion, as it gave occasion to confound them with the true *chalchitis*.

LAPIS *Asbestosus*. See ASBESTOS.

LAPIS *Ætites*. See ÆTITES.

LAPIS *Armenus*. See ARMENIAN Stone.

LAPIS *Affinis*, in the *Natural History of the Ancients*, the name of a stone, called also *sarcophagus*, from its power of consuming flesh.

It was a stone much used among the Greeks in their sepulchres, and is recorded to have always perfectly consumed the flesh of human bodies, buried in it, in forty days. This property it was much famed for, and all the ancient natu-

ralists mention it. There was another very singular quality also in it, but whether in all, or only in some peculiar pieces in it, is not known; that is, its turning into stone any thing that was put into vessels made of it. This is recorded only by Mutianus and Theophrastus, except that Pliny has copied it from these authors; and some of the later writers on these subjects from him.

This effect might probably be a kind of incrustation, formed on substances inclosed in vessels made of this stone, by water passing through its pores, dislodging from the common parts of the stone, and carrying with it particles of such spar as it contained; and afterwards falling in repeated drops on whatever lay in its way, it might again deposit them in such substances, in form of incrustations.

The place from whence the ancients tell us they had this stone was Afso, a city in Lycia, in the neighbourhood of which it was dug: and De Boot informs us, that in that country, and in some parts of the East, there are also stones of this kind, which, if tied to the bodies of living persons, would, in the same manner, consume their flesh. Hill's Notes on Theophrastus, p. 14.

LAPIS *Atramentarius*, the *copier-stone*. See PYRITES.

LAPIS *Bezoardicus*. See BEZOAR.

LAPIS *Bononiensis*, the *Bolonian stone*, a peculiar species of stone found in Bologna. See BONONIAN stone.

LAPIS *Calaminaris*. See CALAMINE and ZINC.

LAPIS *Calcarius*. See LIME and LIMESTONE.

LAPIS *Cauda caneri*, in *Natural History*, a name given by Gesner, and some other writers, to the fossil shells, since called *tubuli marini concaerati*, and by some *polythalamii* and *ortho-ceratitis*. See TUBULI *concaerati*.

LAPIS *Ceratitis*. See UNICORN *suffit*.

LAPIS *Colicus*. See COLIC-stone.

LAPIS *Corneus*, *horn-stone*, a name given by many of the German authors to flint, which some of them have also very improperly called *pyrites*, or the fire-stone, because it is used to strike fire with. See HORNSTONE and PETROSILEX.

LAPIS *Divinus*. See NEPHRITIC stone.

LAPIS *Hæmatites*. See HÆMATITES, and ORES of IRON.

LAPIS *Hepaticus*, *liver-stone*, or *liberstein*, a species of the barytic genus of earths or stones, colour grey, greyish, or yellow-grey, or brown, or greyish-black; lustre, 2.1; transparency, 1; fracture, foliated and partly striated; hardness, from five to six; sp. grav. 2.666; emitting a smell of liver of sulphur when rubbed or heated to redness; not effervescing with acids. According to the analysis of Bergman, a specimen from Andranar in Scania contains 0.38 of barosefelenite, 0.33 of silice, 0.22 of alum, 0.07 of gypsum and 0.5 of mineral oil. Kirwan.

LAPIS *Hibernicus*. See IRISH SLATE.

LAPIS *Hyænius*. See HÆNIUS lapis.

LAPIS *Infernalis*. See LUNAR CAUSTIC.

LAPIS *Islebianus*. See ISLEBIANUS lapis.

LAPIS *Judaicus*. See JUDÆIC.

LAPIS *Lazuli*. See LAZULITE.

LAPIS *Lucis*, the *stone of light*, in the *Materia Medica of the Arabs*, a name given to the brassy marcasite or pyrites. The Arabians have adopted this. Avicenna supposes this substance to be called so, because it was used, after calcination, for diseases of the eyes. It is very probable, that where vitriolic medicines take place, the caput mortuum of this fossil, which is only a colcothar of vitriol, may be of use. But its virtues in this respect can never be supposed so eminent, as to have intitled it to the pompous name it bears. It seems more probable, that it was called the *stone of light*, either from its glittering appearance where fresh broken, or from its giving large sparks of fire, when struck against a

steel.

steel. It was from this quality that it obtained the name of *pyrites*, or fire-stone, it giving fire on the collision with steel much better than flint does.

LAPIS *Lydius*. See *LYDIUS lapis*.

LAPIS *Marmoreus*, a marble stone about twelve feet long and three feet broad, placed at the upper end of Westminster-hall; where was likewise a marble chair erected on the middle thereof, in which our kings anciently sat at their coronation dinner, and at other times the lord-chancellor. Over this marble table are now erected the courts of chancery, and king's-bench. Orig. Juridical. 37.

LAPIS *Melittes*. See *MELITTES*.

LAPIS *Morscabibus*, or *French chalk*. See *MORCHTHUS*.

LAPIS *Medicamentifus*, or the medicinal stone, is a composition of rock alum, litharge, colcothar of vitriol, Armenian bole, and vinegar, boiled to the consistence of a hard stone. It was used to fasten the teeth, preserve the gums, heal and dry up ulcers and wounds; and also in injections, and in compositions for sore eyes.

LAPIS *Musicalis*, the *music-stone*, in *Natural History*, a name given by Mr. Sivers to a stone found in Prussia, carrying naturally on it all the musical characters found on the shell, commonly called the *music-shell*. He describes the stone, which seems to have been a single specimen, and as this author is the only one who ever met with it, it is much to be suspected that either fraud or fancy has had a great share in the matter.

LAPIS *Nephriticus*. See *NEPHRITIC stone*.

LAPIS *Ollaris*. See *POSTONE*.

LAPIS *Specularis*. See *SPECULARIS*.

LAPIS *Thyites*. See *THYITES*.

LAPITHA, in *Ancient Geography*, a town of Cyprus, on a river of the same name; 24 miles W.N.W. of Nicolia. *N.* lat. 35° 23'. E. long. 32° 36'. See *LAPATHUS*.

LAPITHÆUM, a mountain of Laconia. Steph. Byz. *Paufanias* (l. iii. c. 20.) mentions a town of this name in the Peloponnesus, on mount Taygetus, in the same canton.

LAPLAND, in *Geography*, the most northerly country in Europe, extending from the North-Cape, latitude 71½° N., to the White sea, under the Arctic circle, is inhabited by the same people though the country is subject to different powers. When the name Lapland was first given to the country, and that of Laplanders to the people, is uncertain. Saxo Grammaticus, in his commentaries; Adam of Bremen, in his account of the Danes; and Sturleson of Iceland have been cited on this subject, as having named the people in question "Scritthannar," "Scricinnar," or "Finnar;" and at present they are generally called Finns by the Norwegians. The name of Laplanders has been supposed to originate from their attachment to forcery: *lepp*, in their language, signifying a wizard.

Lapland is bounded on the north by the North sea and Frozen ocean; on the east by the White sea; on the south by Sweden and the gulf of Bothnia; and on the west by Norway. On the northernmost side, are what have been denominated the Frozen Alps, or Alps of Snow, which compose that chain of mountains called Severnoi, the declivity of which, towards the east and south, consists of lower mountains, deserts, forests, fens, and lakes. The surface is supposed to contain from seventy to eighty thousand square miles, but its population cannot be ascertained with any degree of precision.

Lapland is divided into three parts, *viz.* 1. That which is subject to Denmark, and is called Norwegian Lapland; this part lies between the Northern sea, the river Pais, and the lake Enarak. 2. Swedish Lapland, which includes all the country from the Baltic to the mountains that separate

Norway from Sweden. It is divided into six districts, denominated *marks*, or territories, which are distinguished by the names of rivers, as Aungnerland, Elma, Peta, Lula, Torna, and Kimi. 3. The eastern part is subject to the czar of Muscovy, situated between the lake Enarak and the White sea: this part of Lapland is divided into three prefectures; namely, that of the sea-coast to the north, called "Mourmankoi Leporie;" that upon the coast of the White sea, denominated "Jerikoi Leporie;" and the inland part, known by the name of "Bellamerskoi Leporie." In Swedish Lapland, the provinces or marks are subdivided into smaller districts called *biars*, consisting each of a number of families, among which the land is parcelled out by government. The whole country consists of huge congeries of frightful rocks and stupendous mountains, interspersed, however, with many pleasant vallies, watered by an infinite number of rivulets that fall into the rivers and lakes, which discharge themselves into the gulf of Bothnia. The chief towns are Kola and Tornea. There are many considerable lakes, as the Great Uma; the Great Windel; the Stor-avan, &c. Some of them are said to extend 60 leagues in length, and contain a great number of islands. Stor-avan is computed to contain 365; and Enara contains so many, that it has been affirmed, that no Laplander has lived long enough to visit each particular island. For the history of this country, we must refer to that of those countries to which it is subject, and also to the article FINNS. The climate is exceedingly cold during the winter months; the lakes and rivers are at that season completely frozen over, and to a great thickness: the whole face of the country is covered with snow to the depth of four or five feet. While this continues loose, it is impossible to travel, but if a partial thaw takes place, the surface of the snow is formed by a succeeding frost into a hard impenetrable crust, over which the inhabitants, by means of their rein-deer, travel with the utmost celerity. While the thaw continues, the air is surcharged with vapours, and the climate is rainy, but so long as the north wind blows, the sky is beautifully serene, and the air is clear. The heat of summer is almost as intolerable in Lapland as the cold of winter. In the more northerly parts of the country, the sun never sets for three months in the summer, and in the winter there is an uninterrupted night of the same duration, but this is qualified by a constant revolution of dawn and twilight, by a serene sky, moon-light, and aurora borealis, so that the inhabitants are enabled to fish and hunt, and to proceed with their ordinary occupations. During the summer season nothing can be more enchanting in many parts, than the vast prospects of mountains, forests, lakes, and rivers. At this season, notwithstanding the climate, the roses are seen in full flower on the banks of the lakes and rivers, with all the beauties of colour which appear in those cultivated in our gardens. In the intervals between the mountains, great part of the country is flat, covered with brown dusky forests of fir and pine trees, and these are often skirted by wide extended morasses, the stagnating waters of which in summer produce myriads of mischievous insects, that are more intolerable than even the cold of winter. The soil of Lapland is very barren, owing chiefly to the want of cultivation. In some districts the land will bear large crops of rye; there are many varieties of berries, as currants, Norwegian mulberries, that grow on a creeping plant; raspberries, cranberries, juniper berries, and bilberries. There are very fine woods of birch, pine, and fir, in several instances disposed by nature, as if they had been planted in regular rows by the hand of art. The service-tree, the willow, the poplar, the elder, and the cornel are found here. Among plants, the angelica

## LAPLAND.

angelica is most cultivated, and highly esteemed: the sorrel is used as an antiscorbutic. They have likewise other kinds of herbs, different species of grafs, heath, fern and moss, but the vegetable which is in the greatest plenty is the lichen. This moss covers the whole ground; its colour is a pale yellow, which when dry changes to white; the regularity of its shape, and the uniform manner in which the surface of the ground is decked with it, appears singular and striking; it has the semblance of a beautiful carpet. These plants grow in a shape nearly octagonal, and approaching to a circle, and as they join each other, they form a kind of Mosaic work, or embroidery. As this moss is very dry, nothing can be more pleasant to tread upon, nor can there be any thing softer for a bed: Acerbi, and his companions, in their journey frequently slept upon it. In some places it seems to be the only herb that will grow; the neighbouring birches and firs appear to vegetate with difficulty, as if deprived of their nourishment by the moss: in short, says the writer, "this moss appeared to be a royal plant, which ruled absolute over the vegetable kingdom of the country, and distributed its bounty and influence among a particular race of men and animals." With respect to the mineralogy of the country; silver and lead have been discovered in the provinces of Pitha and Lula; in the district of Torna there are two copper mines, and some excellent veins of iron. Here are found crystals of a very large size, and so hard and fine, that when polished they resemble real diamonds. In some parts amethysts and topazes are found: also curious stones too hard to be worked by the common tools of the mason. In a few of their rivers they fish for pearls, which are generally pale; but some of them are as bright as the oriental pearls, though larger and more round. Lapland is infested with a great number of grey wolves and bears, with which the natives are perpetually at war. The country likewise abounds with elks, beavers, and otters, which live here unmoletted, and find plenty of fish for their subsistence. The forests of this country furnish haunts to a great number of beautiful martens and squirrels, which change their colour every winter from brown to grey. Here are also ermines, weasels, hares, large black cats which attend the Laplanders in hunting, and little dogs trained to the pursuit of game. But the most remarkable animal of Lapland is the rein-deer. The woods, mountains, and rivers, are well stocked with wild fowl, and all sorts of aquatic birds that build and breed in northern climates. Early in every spring the swans go glither in numerous flocks from the German ocean: the lapwings follow in such swarms that they darken the sky. The rocks and mountains are frequented with eagles, hawks, kites, falcons, and other birds of prey. The rivers abound with salmon, which ascend from the gulf of Bothnia, trout, bream, and perch of excellent flavour, and amazing magnitude. The insects are extremely numerous; they often obscure the face of day; and are so venomous that the rein-deer, to avoid them, fly to the tops of the highest mountains for shelter, and the inhabitants betake themselves to the seaside, which is less infested than other parts by these pestilent vermin.

The commerce carried on by the Laplanders is more considerable than one would expect in a desert country, inhabited by a savage and ignorant people. They export large quantities of fish to Bothnia and White Russia. They trade with the neighbouring countries of Norway, Sweden, Muscovy, and Finland, by the sale of rein-deer, fine furs, baskets, toys of their own manufacture, and cheese made of the rein-deer's milk. They receive in return rix-dollars, woollen cloths, linen, copper, tin, flour, oil, hides, cutlery, spirits, and tobacco. The Laplanders march in caravans to the

fairs in Finland and Norway; these are composed of a long string of 30 or 40 rein-deer tied to one another, the foremost being led by a Laplander who walks in front. At night, when they have fixed upon a spot to rest on, they form a large circle of their rein-deer and pulkas or sledges, ready yoked, and the animals lying down quietly on the snow, are fed with moss by their masters. The people kindle great fires, around which they sit and sup, and smoke and sleep. The revenue arising from this country is not of much consequence; it is partly paid in rix-dollars, but chiefly in furs, and the tribute from the poorer classes is taken in dried fish. Part of the taxes is allotted for the maintenance of the clergy.

The Laplanders are short, few of them being five feet high; in their dresses they use no kind of linen; the men wear a sort of pantaloons reaching to their shoes, and their doublet is made to fit the shape; over this is a close coat with narrow sleeves, which is fastened round them with a leathern girdle. To the girdle are attached their knives, their pipes, and their instruments for striking fire. The dresses of the women is very much like that of the men, but in addition to it they wear handkerchiefs, short aprons, rings on their fingers, and in their ears, from which among the rich are suspended chains of silver, which pass twice or thrice round the neck. They are much addicted to finery, and to the use of embroidery manufactured from brass wire. They change their habitations according to the season, living in houses in the winter, and in summer they make use of tents. Their household furniture consists of iron or copper kettles, wooden cups, bowls, spoons, and sometimes tin or even silver basons, to which must be added the implements of fishing and hunting. The inhabitants are chiefly divided into fishers and mountaineers. The former build their habitations near some lake, from which they derive their subsistence. The others seek their support on the mountains, possessing herds of rein-deer more or less numerous; these are very rich in comparison of the fishermen. It is usual to assign to every child at its birth a number of these animals, which, with their produce and increase are to belong to it, so that when he arrives at man's estate, he finds himself master of several hundred rein-deer. The following description of a Lapland family was given from the life by an intelligent traveller: "it consisted of an old man and his wife, with a child about two or three months old. The infant was trusted up in a kind of cradle, resembling, in shape, a fiddle case, made of the thick bark of a tree, so formed that it exactly contained the child, which was fixed in it with a kind of brass-chain. It was covered with fine and soft moss, over which was spread the skin of a young rein-deer. The cradle was swung on a rope, which was fastened to the top of the hut." The Laplanders are averse from war, and will forsake their homes, to which they are much attached, rather than engage in it. Their manners and habits are finely described by Thomson, who, in comparing them with the martial hordes of the north, says,

"Not such the sons of Lapland: wifely they  
Despise th' insensate barbarous trade of war;  
They ask no more than simple nature gives;  
They love their mountains, and enjoy their storms.  
No false desires, no pride-created wants  
Disturb the peaceful current of their time;  
And through the restless ever-tortured maze  
Of pleasure or ambition bid it rage.  
Their rein-deer form their riches. These their tents,  
Their robes, their beds, and all their homely wealth  
Supply: their wholesome fare and cheerly cups."

Great pains have been taken by the Danes and Swedes to improve

form the minds of the Laplanders on the subject of religion, but the majority of them continue to practise superstitions and idolatries, as grofs as any that are to be met with among the most uninftructed Pagans. They rely on augury and witchcraft, and have been confidered by many of our countrymen, who have vifited thofe parts, as skillful in magic and divination. Their magicians make ufe of what they call a drum, an inftrument like the tambourine. On this, thofe who profefs to be Chriftians draw the figures of their own gods, as well as thofe of Jefus Chrift, the apoftles, the fun, moon, ftars, rivers, &c. : on different parts of this inftrument and its ornaments are placed fmall brafs rings, which, when the drum is beaten with a little hammer, dance over the figures, and according to their progrefs the forcerer prognofitates. They retain the worfhip of many Teutonic gods, and have among them confiderable remains of Druidical infitutions. They believe in the tranfmigration of the foul, and have feftivals fet apart for the worfhip of certain genii, who, they imagine, inhabit the air, and have the diretion and fuperintendance of human aétions. A black cat is reckoned one of the moft valuable appendages in each houfe : they talk to it as to a rational creature, and in their hunting and fifhing parties it is their ufual attendant. To this animal the Danifh Laplanders communicate their fecrets ; they confult it on all important occafions ; and among the Swedifh Laplanders, the drum is kept in every family for the purpofe of confulting the devil.

The account given by M. Maupertuis of the rigour of this climate, when he went to the polar circle to ascertain the real figure of the earth, deferves to be noticed in this article. He obferves, that in the month of December fpirits froze within their houfes ; and if the door of a warm room were opened only for a moment, the external air infantly converted all the vapour within into a kind of fnow, whirling it round in vortexes. When they went abroad, they felt as if the air was tearing their breafts to pieces, and within doors, the cracking of the wood, of which the houfes were built, continually warn them by its contraction of an increafe of cold. In fpeaking of the atmofpheric appearances, and of the heavenly bodies ; he fays, the brightnefs of the moonlight, the twinkling of the ftars, and the effulgent corufcations of the aurora borealis, afford a light fufficient for moft of the occafions of life. No fooner, fays he, are the fhort days clofed, than fires of a thoufand figures and colours light the fky, as if intended to make up for the abfence of the fun. Thefe lights are perpetually variable. Sometimes they begin in the form of a great fear of bright light, with its extremities upon the horizon, which, with the motion refembling that of a fifhing-net, glides foftly up the fky, preferving a diretion nearly perpendicular to the meridian, and commonly after thefe preludes all the lights unite at the zenith, and form the top of the crown. It would be difficult to enumerate the different figures which thefe meteors affume, and the various motions with which they are agitated. Their motion is moft commonly like that of a pair of colours waving in the air, and the different tints of their light give them the appearance of fo many ftreamers of changeable filk. " I faw," fays the philofopher, " a phenomenon of this kind, that in the midft of all the wonders to which I was now every day accuftomed, excited my admiration. To the fourth a great fpace of fky appeared tinged with fo lively a red, that the conftellation of Orion looked as if it had been dipped in blood. This light, which was at firft fixed, foon moved, and changing into other colours, violet and blue, fettled into a dome, the top of which itood a little to the fourth-weft of the zenith. In this country, where there are lights of fo many different colours, I never faw

but two that were red, and fuch are always taken for prefages of fome great miffortune. It is not at all furprizing, if people, with an unphilofophic eye, difcover in thefe phenomena armies engaged, fiery chariots, and a thoufand other prodigies. To the enlightened and rational philofopher, Lapland every where preents fubjects of reflection and contemplation : no arts flourish here ; we no where meet with temples, houfes, wrecks of columns, or of other monuments, but a fine opportunity is afforded of ftudying among the wandering tribes the firft elements of focial life ; of fociety in its moft ancient form." Acerbi's Travels into Sweden, Lapland, &c. Conftet's Tour to Lapland.

LA PLATA. See *La PLATA*.

LAPMARK. See *FINMARK*.

LAPOUTI, a mountain of Afia, between Caffgar and Little Tibet.

LAPPA, in *Botany*, the Latin name for any kind of Bur, or feed that fticks to the coats of animals. See *ACTIUM*, *APARINE*, and *XANTHUM*.

LAPPAGO, a name for the *Galium Aparine*, or Goose-grafs, alluding to the bur-like nature of its feeds. (See *LAPPA*.) It is now appropriated by Schreber to a particular genus of grafses ; fee the next article.

LAPPAGO, fo named by Schreber, on account of the bur-like afpect of the feed invefted with its mucicated hulks. —Schreb. 55. Willd. Sp. Pl. v. 1. 484. Mart. Mill. Dict. v. 3. Sm. Prodr. Fl. Græc. Sibth. v. 1. 76. Ait. Hort. Kew. ed. 2. v. 1. 182. (Tragus ; Hall. Hist. v. 2. 203. Desfont. Atlant. v. 2. 386.)—Clafs and order, *Triandria Digenia*. Nat. Ord. *Gramina*, Linn.

Gen. Ch. Cal. aggregate, each glume of one valve, fingle-flowered, lanceolate, pointed, ventricofe, angular, furrowed, permanent, mucicated at the back with a triple row of cartilaginous prickles, hooked upwards. *Flori* folitary, leaflefs. *Cor.* of two valves, fmallier than the calyx, awnlefs, fmoother, membranous and whitifh ; its glumes lanceolate, acute, concave ; the outermoft oppofite to the calyx, ribbed, inner more delicate and but half the fize of the outer, embraced by the calyx. Nectary of two lanceolate acute leaflets. *Stam.* Filaments three, capillary, the length of the glumes ; anthers fhort, deeply divided. *Pift.* Germen fuperior, ovate ; ftyles two, capillary, rather fhort ; fignmas cylindrical, feathery. *Peric.* none, except the permanent corolla. *Seed* unconnected, elliptic-oblong, with a longitudinal furrow.

Eff. Ch. Calyx mucicated, of one valve, fingle-flowered, aggregate. Corolla of two valves, awnlefs.

The only known fpecies is

1. *L. racemofa*. Branching Bur-grafs.—Sm. Fl. Græc. Sibth. v. 2. t. 101. Hoff. Gram. Austr. v. 1. 28. t. 36. (Cenchrus racemofus ; Linn. Sp. Pl. 1487. Schreb. Gram. v. 1. 45. t. 4. Gramen caninum maritimum afperum ; Bauh. Prodr. 2. Theatr. 16.)—Native of the fandy fea-fhores of the fourth of Europe, as well as of Arabia and India. It is a hardy annual with us, flowering in the warmeft part of the fummer. The root confifts of downy fibres. *Stems* numerous, a fpan high, jointed, unbranched, leafy, round, fmoother, decumbent and taking root at the bottom. *Leaves* fpreading, lanceolate, very acute, flat, ftriated, fmoother, except the edge, which is fringed as well as toothed ; the bafe is heart-fhaped ; the upper leaves are very fhort ; theaths rather fwelling, ftriated, fmoother, the upper ones longeft. *Stipula* fhort, fringed. *Spikes* terminal, folitary, two or three inches long, erect, cylindrical, obtufe, many-flowered, generally purplifh, and of an unufual afpect on account of the prickly hulks. Their common *ftalk* is hairy. *Flowers* three or four on each little zig-zag partial ftalk, alternate, rather

rather distant, erect, the uppermost generally abortive. The lower part of the *spike* is thin and flagging.

**IAPPANO**, in *Geography*, a town of Naples, in Calabria Citra; four miles N. of Cosenza.

**IAPPO**, a small island in the Baltic, between the coast of Finland and the island of Åland. N. lat. 60° 20'. E. long. 20° 48'.—Also, a town of Sweden, in the government of Abo; 23 miles S. of Abo.—Also, a town of Sweden, in East Bothnia, and government of Wafå; 37 miles E.N.E. of Wafå.

**LAPPO Serfoi**, a town of Sweden, in East Bothnia; 60 miles S.E. of Wafå.

**LAPPOJOCK**, a river of East Bothnia, which runs into the sea, five miles below Ny-Karleby.

**LAPPÖREN**, a small island on the E. side of the gulf of Bothnia. N. lat. 63° 23'. E. long. 20° 59'.

**LAPTRASK**, a town of Sweden, in the province of Nyland; 21 miles N.E. of Borgo. N. lat. 60° 37'. E. long. 26° 12'.

**LAPPULA**, in *Botany*, a name given by some to the great caucalis, or rough-fruited stone-parley, or bastard parley.

**LAPSANA**, by some written *Lampfana*, an old Latin name, usually derived from *λαπάρα*, to purge or evacuate, on account of a supposed quality in the plant. Ambrosinus deduces it, by antiphrasis, from *λαπαρηνος*, *delstitute of splendour*, because of the mean appearance of the herb.—Linn. Gen. 405. Schreb. 534. Willd. Sp. Pl. v. 3. 1622. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 842. Juss. 168. Tourn. t. 272. Lamarek. Illustr. t. 655. Gært. t. 157. (Rhadagiolus; Cæfalp. 511. Schreb. 534. Willd. Sp. Pl. v. 3. 1625. Mart. Mill. Dict. v. 4. Juss. 168. Tourn. t. 272. Lamarek. Illustr. t. 655. Gært. t. 157. Koelpinia; Pallas. It. v. 3. 755.)—Class and order, *Syngenesia Polygamia-aqualis*. N. O. d. *Compositæ Semisfoculose*, Linn. *Cichoraceæ*, Juss.

Gen. Ch. *Common Calyx* ovate, somewhat cylindrical, angular, of about eight equal, linear, keeled, channelled, acute scales, with a few small imbricated ones at the base, all permanent. *Cor.* compound, imbricated, uniform; the florets hermaphrodite, about 16, more or less, equal, each of one petal, ligulate, abrupt, with five teeth. *Stam.* Filaments five, capillary, very short; anthers united into a cylindrical tube. *Pist.* Germen rather oblong; style thread-shaped, as long as the stamens; stigma cloven, reflexed. *Peric.* none, except the permanent scales of the calyx. *Seeds* solitary, oblong, angular, contracted at the top, upright or spreading, destitute of wing or down. *Recept.* naked.

Eff. Ch. Receptacle naked. Calyx with scales at the base, its inner scales equal, channelled. Seeds without down, contracted at the top.

1. *L. communis*. Common Nipple-wort.—Linn. Sp. Pl. 1141. Engl. Bot. t. 844. Curt. Lond. fasc. 1. t. 59. Fl. Dan. t. 500.—Calyx of the fruit closed, unchanged, smooth. Seeds loose. Stem panicled.—Frequent in waste or cultivated ground throughout most parts of Europe, flowering in summer. The root is annual. *Stem* erect, two or three feet high, roundish, nearly smooth, much branched in a panicled manner, leafy in the lower part. *Leaves* soft and rather hairy, toothed; the radical ones lyrate, the others ovate, acute, alternate. *Flowers* small, yellow, on long, slender, alternate stalks. *Seeds* nearly straight and erect, angular and striated, surrounded by the dried, smooth, permanent, scarcely changed calyx, but unconnected with it, and at length falling out, leaving it empty. This plant is said to be called *Papillar*, in Prussia, a name synonymous with Nipple-wort; because it is said to cure ulcerated breasts.

A variety of this, with the margins of its leaves curled, and more deeply as well as unequally toothed, is *L. crispata* Willdenow, said by him to continue constant from seed. Linnaeus considered it a variety, nor do we find reason to swerve from that opinion.

2. *L. stellata*. Starry Nipple-wort.—Linn. Sp. Pl. 1411. Gært. v. 2. 354. (L. n. 3; Gerard. Gallopr. 175. Rhadagiolus stellatus; Willd. n. 1. Rhadagiolus altera; Cæfalp. 511. Hieracium stellatum; Bauh. Hist. v. 2. 1014. H. narbonense falcatum; Lob. Ic. 240. H. falcatum Lobelii; Ger. em. 298.)—Seeds awl-shaped, spreading, somewhat incurved, embraced by the mucricated calyx-scales. Stem widely spreading. Radical leaves obovate, somewhat runcinate.—Native of the south of Europe. *Root* annual. *Stems* several, widely spreading or decumbent, branched. *Leaves* thin and nearly smooth, except a little roughness about the edge; the lower ones obovate, rather acute; tapering and nearly entire at the base; more or less runcinate about the middle, with numerous sharp teeth, each tipped with a little pale callous point: the upper leaves are linear-lanceolate, undivided and nearly entire. *Flowers* small, yellow, on long spreading stalks. *Calyx* rough with minute ascending bristles or prickles. Perfect seeds generally eight,  $\frac{2}{3}$  of an inch long, widely spreading in the form of a star, awl-shaped, slender, smooth, each embraced by one scale of the calyx, which rather exceeds it in length, and is externally rough with little prominent prickles, especially towards the point. About two or three very much incurved, smaller, apparently abortive seeds are found in the centre, each in like manner invested with its rough calyx-scale. All the seeds, as well as the calyx, are firmly united together to the tumid receptacle, which they entirely cover, till they are loosened by time or decay.

We unite, without the least scruple, the *L. stellata* and *L. Rhadagiolus* of Linnaeus as one species, on the authority of his own specimens, as well as that of his and our learned friend Gerard. They differ only in having more or less toothed radical leaves. Every other part precisely accords. Whether the two following be distinct from this now described may admit of some doubt, but we are persuaded they are so.

3. *L. Rhadagiolus*. Bird's-foot Nipple-wort.—Scop. Carn. ed. 2. v. 2. 119. (Rhadagiolus edulis; Gært. v. 2. 354. Willd. n. 2. Rh. lampfanae foliis; Tourn. Cor. 36? Rh. alter; Tourn. Inf. 480. t. 272. Rh. fig. 1. Lamarek. Illustr. t. 655. Rhadagiolus; Cæfalp. 511.)—Seeds few, awl-shaped, widely spreading, somewhat recurved, embraced by the smooth calyx-scales. Stem spreading. Radical leaves deeply runcinate, with rounded lobes.—Native of the south of Europe. We have garden specimens, named *L. stellata*, from Mr. Davall. The radical leaves are deeply and regularly pinnatifid in a lyrate manner, with two or three pair of opposite lobes, all rounded and blunt like the terminal one, but each tipped nevertheless, as in the former, with a little callous or glandular point. The calyx is perfectly smooth, both in flower and fruit. Perfect seeds generally but four, shorter and thicker than in the last, coloured, recurved, or, as Scopoli observes, deflexed, well compared by Cæfalpinus to a bird's foot, from which description and Tournefort's figure there can be no doubt of this being the plant both these authors meant, though Tournefort appears to have reversed the two species of Cæfalpinus; and hence perhaps arose the almost inextricable confusion among following authors. Linnaeus could not correct this, as he never saw but one species. We believe the two to be truly distinct. The resemblance of the radical leaves of the present to *L. communis*, makes us retain the

synonym of Tournefort's Corolla, though with a mark of doubt.

4. *L. Koelpinia*. Linear-leaved Nipple-wort.—Linn. Suppl. 348. (*Koelpinia linearis*; Pallas It. v. 3. 755. t. 1, l. f. 2. *Rhagadiolus Koelpinia*; Willd. n. 3.)—Seeds numerous, awl-shaped, spreading, incurved, embraced by the mucricated calyx-leaves. Leaves all linear-lanceolate, entire.—Found by Pallas in only one moist valley, by mount Bogden, in the desert of Attraction. We have a wild specimen from Aleppo, given by sir Joseph Banks. It flowers in the middle of May, ripening seed by the end of the month. The yellow blossoms open to the morning sun, and close at noon. This is a very slender plant, with a small annual root. The stems are from ten to eighteen inches long, scarcely branched, loosely spreading, smooth; square and furrowed towards the top. Leaves distant, all linear lanceolate, acute, entire, pliable, smooth, obscurely three-ribbed. Flowers solitary, on short scattered stalks, from the very root to the extremity of each stem. Calyx clothed with incurved prickles. Ripe seeds numerous, about twelve or fourteen, spreading from their base, but strongly incurved, each invell'd with one of the calyx-leaves, whose numerous, incurved, hooked prickles are much more remarkable than in either of the two last, some of them forming a recurved star at the top of each seed. This species is more akin to *L. stiltata* perhaps than any other, but the characters given above seem sufficient to keep them distinct. Pallas suggested the propriety of separating the three last-described species from *Lapsana*, by the name of *Koelpinia*; see that article. Whether they ought to form a genus, is, to us at least, doubtful. Schreber has agreed with Pallas if this point, only properly preferring the name of *Rhagadiolus* for the genus, as given by Cæsalpines and Tournefort, and correctly derived from *ῥαγὰς*; *ῥαγὰδες*, a cleft or fissure, whether it alludes to the reputed virtues of these plants in healing cracks of the skin, or to the cut (or star-like) aspect of the seeds. In habit they sufficiently accord with the original *Lapsana*, and the difference in the position of the ripening seeds is their only distinction. We ought rather perhaps to admire the sagacity of Linnæus in perceiving their agreement, than the ingenuity of those who have distinguished them. Pallas himself, with great modesty, merely submits his opinion to the decision of those who take the lead in botany. In the same uncertainty we wish now to leave it.—*L. Zacyntna* seems to be separated from the rest with more propriety, as its seeds have a feathery crown, and the nature of the torose calyx is more like that of *Crepis*. Jussieu includes it under his genus *Hedynopsis*; see that article.

Three much more dissimilar plants are ranged under *Lapsana* by Willdenow. These are *Hyoferis fatida* and *minima* of Linnæus, with *L. virgata* of Desfontaines, Fl. Atlant. v. 2. t. 215.—The first is on the authority of Haller and Scopoli, who say the seeds are without down. We have never seen them, but the stemless habit of the plant, and its whole aspect, exactly like a *Leontodon*, are so foreign to *Lapsana*, that the natural characters of the genus would be overlet by its admission.—*Hyoferis minima*, Gærtner's *Arnoferis*, t. 157, is indeed less unlike in habit, though stemless; but the seeds have an elevated border, and do not agree with *Lapsana*.

The third, *virgata*, has so great a number of florets as to take off an important part of its generic affinity, and its habit is more like an *Hedynopsis*. Having seen no specimen, we can decide nothing as to this species. It is necessary to know whether the seeds have an elevated border, in which case it might very well be placed along with *Hyoferis minima*, wherever that remains; or whether they be truly all without

a crown, and contracted at the summit, as in the true species of *Lapsana*. S.

LAPSARIÏ. See INFRALAPSARIÏ, SUBLAPSARIÏ, and SUPRALAPSARIÏ

LAPSE, in Law, a slip or omission of a patron to present a clerk to a benefice within six months of its being void: in which case, the benefice is said to be in lapse, or lapsed, and the right of presentation devolved to the ordinary.

And if the ordinary neglect to present during the same time, the right of presentation accrues to the metropolitan, and to the king by neglect of the metropolitan. This right of lapse was first established in the reign of Henry II., when the bishops first began to exercise universally the right of institution to churches (Braët. l. 4. tit. 2. c. 3.); and therefore, when there is no right of institution, there is no right of lapse; so that no donative can lapse to the ordinary, unless it hath been augmented by the king's bounty (fl. 1 Geo. I. st. 2. c. 10.); but no right of lapse can accrue when the original presentation is in the crown. (St. 17 Edw. II. c. 8. 2 Inst. 273.) In case the benefice becomes void by death, or cession through plurality of benefices, then the patron is bound to take notice of the vacancy at his own peril; but in case of a vacancy by resignation, or canonical deprivation, or if a clerk presented be refused for insufficiency, these being matters of which the bishop alone is presumed to be cognizant, here the law requires him to give notice thereof to the patron; otherwise he can take no advantage by way of lapse. (4 Rep. 75. 2 Inst. 632.) Neither shall any lapse accrue thereby to the metropolitan or the king. If the bishop refuse or neglect to examine and admit the patron's clerk, without good reason assigned or notice given, he shall have no title to present by lapse (2 Roll. Abr. 639.); and if the right of presentation be litigious or contended, and an action be brought against the bishop to try the title, no lapse shall occur till the question of right be decided. (Co. Litt. 344.) If the bishop be both patron and ordinary, he shall not have a double time allowed him to collate in (Gibf. Cod. 769.); and if the bishop doth not collate his own clerk immediately to the living, and the patron presents, though after the six months are lapsed, yet the presentation is good, and the bishop is bound to institute the patron's clerk. (2 Inst. 273.) If the bishop suffer the presentation to lapse to the metropolitan, the patron also has the same advantage if he presents before the archbishop has filled up the benefice: yet the ordinary cannot after lapse to the metropolitan, collate his own clerk to the prejudice of the archbishop. (2 Roll. Abr. 368.) But if the presentation lapses to the king, the patron shall never recover his right, till the king has satisfied his turn by presentation; for *nullum tempus occurrit regi*. But to prevent the inconvenience of the church's continuing void for ever, unless the king shall be pleased to present, the law has lodged a power in the patron's hands of, as it were, compelling the king to present. For if, during the delay of the crown to present, the patron himself presents, and his clerk is instituted, the king indeed, by presenting another, may turn out the patron's clerk; or, after induction, may remove him by *quare impedit*; but if he does not, and the patron's clerk dies incumbent, or is canonically deprived, the king hath lost his right, which was only to the next or first presentation. 7 Rep. 28. Cro. Eliz. 44. Blackst. Com. vol. ii.

LAPSED LEGACY. See LEGACY.

LAP-SIDED, in Sea Language, denotes the state of a ship, which is built in such a manner as to have one side heavier than the other, and consequently to retain a constant

heel or tendency toward the heavier side, unless when the is brought upright by placing a greater quantity of the cargo or ballast on the other side.

**LAPTANA**, in *Geography*, a town of Prussia, in the province of Samland; 10 miles N. of Konigberg.

**LAPTCHOUT-HOTUN**, a town of Asia, in the country of Hami; 30 miles W. of Hami-Hotun. N. lat. 43°. E. long. 92° 48'.

**LAPUSZNA**, a town of European Turkey, in Moldavia, near a river of the same name; 50 miles E.S.E. of Jassi.

**LAPWING**, **CAPELLA**, in *Ornithology*, the black-breasted tringa, with a hanging crest, or *Tringa vanellus* of Linnæus, commonly known in England by the name of lapwing or bastard plover, and called by some, in Latin, *vanellus*. See **TRINGA**.

Were the lapwing less common, it would be highly esteemed for its beauty. It is very frequent in our sunny countries, and in the wet places of most other parts of Europe.

It lays four eggs, of an olive cast, spotted with black, in a slight nest made with a few bents. The young, as soon as hatched, run like chickens, and are preserved with great anxiety and clamour by their parents from apprehended danger; which are said to flutter along the ground to a considerable distance from their nest, to elude pursuers, and to become more clamorous when most remote from it. The eggs are much valued for their delicacy, and are sold by the London purveyors for three shillings per dozen. In winter, lapwings join in large flocks, and are very wild; their flesh is very good, their food being insects and worms. During October and November, they are taken in the fens in nets, in the same manner as ruffs are, but are not preserved for fattening, being killed as soon as caught. Ray and Pennant.

**LAQUEARIUS**, a kind of athlete among the ancients, who in one hand held a *laqueus*, i. e. a sort of snare, wherewith to embarrass and entangle his antagonist, and in the other a poignard to stab him.

**LAQUER**. See **LACQUER**.

**LAQUEUS**, in *Surgery*, a *noose* or *snare*; or a kind of ligature, so contrived, that when stretched, by any weight, or the like, it draws up close.

It is used to extend broken or disjoined bones, to keep them in their places, when they are set, and to bind the parts close together.

**LAQUILO**, in *Geography*, a small island in the Mediterranean, near the coast of Murcia, about 3 miles S.E. of Almagaran.

**LAR**, or **LAAR**, a city of Persia, and capital of Laristan, situated on a sandy soil, amidst barren mountains; but the gardens, of which each house has one, abound with dates, an excellent fruit, which particularly prospers in this part of Persia. The houses are low, and in the time of Chardin were about 200. The city also contains bazars, mosques, a castle on a rocky, and a palace, in which the governor resides. The Jews reside in a quarter by themselves, and carry on a silk manufacture; and the Dutch have a factory here. In the vicinity are plantations of oranges and tamarinds, as well as dates; and at the foot of a mountain, at a small distance from the city, is found the substance called "Mummy;" 120 miles W. of Ormus. N. lat. 27° 20'. E. long. 54° 10'.

**LARAA**, a town of Spain, in Old Castile, on the Arlenza; 13 miles S.S.E. of Burgos.

**LARACHA**, or **LARACHE**, a sea-port town of Africa, in the empire of Morocco, on the river Luccos, near the Atlantic

ocean. The environs are intersected by woods and marshes. A fort, built by the Spaniards, on the land side, still remains, and the castle on the side of the road is defended by batteries, which lie close to the water's edge. The river is of good depth; and some commerce was formerly carried on in this place by the Europeans; but in the year 1780, the emperor compelled the merchants to retire. The large vessels of the emperor usually winter here; but there are no docks for ship-building. The road of this harbour is insecure in winter, but it is free from danger between the beginning of April and the end of September; 33 miles S. of Tangiers. N. lat. 34° 58'. W. long. 6° 2'. Chénier's Morocco, vol. i.

**LARADA**, a town of Tripoli; 30 miles S.E. of Mesurada.

**LARAGNE**, a town of France, in the department of the Higher Alps, and chief place of a canton, in the district of Gap; 9 miles S.S.E. of Serres. The place contains 664, and the canton 3673 inhabitants, on a territory of 192½ kilometres, in 8 communes.

**LARANDA**, in *Ancient Geography*, a town of Asia, in Cappadocia, belonging to Astiochiana, according to Ptolemy, who joins this canton to Lycocania, but by other authors it is united with Pisidia and Hauria.

**LARASSA**, a town of Asia, in Media, not far from Ecbatana. Ptol.

**LARBOARD**, in *Sea Language*, the left-hand side of the ship, looking forward from the stern.

**LARBORUM**, in *Ancient Geography*, an episcopal town of Asia, in Caria.

**LARCENY**, or **LARCINY**, in *Law*, is a theft of personal goods or chattels, in the owner's absence. See **THEFT**.

The word comes from the French *larcin*; and that from the Latin *latrocinium*, *theft*.

Larceny is distinguished by the law into two sorts; the one called *simple larceny*, or plain theft, unaccompanied with any other atrocious circumstance; and *mixed or compound larceny*, which includes in it the aggravation of taking from one's house or person.

In respect of the things stolen, *simple larceny* is either *great or small*.

**LARCENY**, *Great*, *Grand*, is when the things stolen, though severally, exceed the value of 12*d*.

**LARCENY**, *Petty*, or *Petit*, is when the goods stolen exceed not the value of 12*d*.

*Simple larceny* is defined the felonious taking, and carrying away, the personal goods of another: so that in order to constitute this crime, there must be a *taking*, which implies the consent of the owner to be wanting; and therefore no delivery of the goods from the owner to the offender, upon trust, can ground a larceny. By the common law it was no larceny in a servant to run away with the goods committed to him to keep, but only a breach of trust: but by statute 21 Hen. VIII. c. 7. if any servant embezzles his master's goods to the value of 40*s*. it is made felony, except in an apprentice and servants under eighteen years old. But if he had not the possession, but only the care and oversight of the goods, as the butler of plate, the shepherd of sheep, and the like; the embezzling of them is felony at common law. (1 Hal. P. C. 506.) By the declaratory act of 39 Geo. III. c. 85. entitled "An act to protect masters against embezzlements by their clerks or servants," it is enacted and declared, that if any servant or clerk, or any person employed for the purpose in the capacity of a servant or clerk, to any person or persons whomsoever, or to any body corporate or politic, shall, by virtue of such employment,

## LARCENY.

ployment, receive or take into his possession any money, goods, bond, bill, note, banker's draft, or other valuable security, or effects, for, or in the name, or on the account of his master or masters, or employer or employers, and shall fraudulently embezzle, secrete, or make away with the same, or any part thereof; every such offender shall be deemed to have feloniously stolen the same; although such money, goods, &c. was or were not otherwise received into the possession of such master or masters, &c. than by the actual possession of his or their servant, clerk, or other person so employed. And every such offender, his adviser, procurer, aider, or abettor, being thereby lawfully convicted or attainted, shall be liable to be transported to such parts &c. for any term not exceeding fourteen years, in the discretion of the court before whom he shall be convicted or adjudged. Several statutes have also, at various times, passed to protect public companies from deprivations by their officers and servants; as 15 Geo. II. c. 13. f. 12. with respect to those of the bank of England, rendering embezzlement a capital felony; 35 Geo. III. c. 66. f. 6. and 37 Geo. III. c. 46. touching certain annuities payable at the bank of England, and containing the same provisions as the 15 Geo. II. c. 13. f. 12. The 24 Geo. II. c. 11. f. 3. contains the same provisions respecting the officers and servants of the South Sea house. So if a guest robs his inn or tavern of a piece of plate, it is larceny (1 Hawk. P. C. 90.); and so it is declared to be by 3 & 4 W. & M. c. 9. if a lodger runs away with the goods from his ready furnished lodgings. There must also be a *carrying away*; and a bare removal from the place in which he found the goods, though the thief does not quite make off with them, is sufficient. But this must be *felonious*, i. e. done *animo furandi*, or, as the civil law expresses it, *lucri causa*. (Inst. 4. f. 1.) The ordinary discovery of a felonious intent, is where the party doth it clandestinely, or, being charged with the fact, denies it: besides which, there are other circumstances that evince a felonious intent, which are left to the consideration of the court and jury. Moreover, this felonious taking and carrying away must be of the *personal goods of another*. Of things that adhere to a freehold, as corn, grass, trees, and the like, or lead upon a house, no larceny could be committed by common law; but the severance of them was, and in many things is still, merely a trespass: however, if the thief severs them at one time, whereby the trespass is completed, and they are converted into personal chattels, in the constructive possession of him on whose soil they are left or laid, and comes again at another time, when they are so turned into personality, and takes them away, it is larceny; and also if the owner, or any one else, has severed them. (3 Inst. 109. 1 Hal. P. C. 510.) And by 4 Geo. II. c. 32. to steal, or sever with intent to steal any lead or iron fixed to a dwelling-house, or out-house, or in any court or garden belonging to it, is made felony, liable to transportation for seven years. And by 21 Geo. III. c. 68. he who shall steal, rip, cut, break, or remove, with intent to steal any copper, brass, bell-metal, utensil, or fixture, fixed to any building, or in any garden, orchard, court-yard, fence, or outlet, belonging to any building, or iron-rails, or fencing, &c. and also his aiders and abettors, and all who shall knowingly buy or receive the same, shall be guilty of felony, and transported for seven years, or detained in prison and kept to hard labour, not exceeding three years, nor less than one, and within that time, if the court shall think fit, shall be once or oftener, but not more than thrice, publicly whipped. Moreover, to steal underwood or hedges, and the like, to rob orchards or gardens of fruit growing therein, to steal or otherwise destroy any turnips, or the roots of madder

when growing, are, by 43 Eliz. c. 7. 15 Car. II. c. 2. 31 Geo. II. c. 25. 6 Geo. III. c. 48. 9 Geo. III. c. 41. 13 Geo. III. c. 32. punishable criminally by whipping, small fines, imprisonment, and satisfaction to the party wronged, according to the nature of the offence. Moreover, the stealing by night of any trees, roots, shrubs, or plants, to the value of 5s. is by 6 Geo. III. c. 36. made felony in the principals, aiders, and abettors, and in the purchasers knowing the same to be stolen: and by 6 Geo. III. c. 48. and 13 Geo. III. c. 13. the stealing of any timber-trees, as oak, beech, chestnut, walnut, ash, elm, cedar, fir, asp, lime, sycamore, birch, poplar, alder, larch, maple, and hornbeam, and of any root, shrub, or plant, by day or night, is liable to pecuniary penalties for the first two offences, and for the third is constituted a felony, liable to transportation for seven years. Stealing ore out of mines is no larceny, except the stealing ore out of mines of black lead, which is felony without benefit of the clergy by 25 Geo. II. c. 10. Stealing of writings relating to a real estate is no felony, but a trespass (1 Hal. P. C. 510. Stra. 1137.): bonds, bills, and notes are goods of which larceny cannot be committed by common law (8 Rep. 33.): but by 2 Geo. II. c. 25. they are put upon the same footing with respect to larcenies, as the money they were designed to secure. And by 7 Geo. III. c. 50. if any officer or servant of the post-office shall secrete, embezzle, or destroy any letter or packet, containing any bank-note, or other valuable paper, specified in the act; or shall steal the same out of any letter or packet, he shall be guilty of felony without benefit of clergy. Or if he shall destroy any letter or packet with which he has received money for the postage, or advance the rate of postage, and secrete the money, he shall be guilty of single felony. By 26 Geo. II. c. 19. plundering or stealing from any ship in distress, whether wreck or no wreck, is felony, without benefit of clergy. For the laws relating to fish and game, see *Stealing of FISH and GAME*.

Of all valuable domestic animals, as horses, and of all animals, *domite nature*, which serve for food, as swine, sheep, poultry, and the like, larceny may be committed; and also of the flesh of such as are *feræ nature*, when killed. 1 Hal. P. C. 511.

Although no larceny can be committed, unless there be some property in the thing taken, and an owner; yet, if the owner be unknown, provided there be a property, it is larceny to steal it; and an indictment will lie, for the goods of a person unknown. (1 Hal. P. C. 512.) This is the case of stealing a shroud out of a grave; which is the property of those, whoever they were, that buried the deceased; but stealing the corpse itself, which has no owner, (though a matter of great indignity,) is no felony, unless form of the grave clothes be stolen with it.

By the Roman law, the penalty of *simple* and *secret* larceny was the returning it two-fold; and of *manifest* larceny four-fold: *manifest* larceny was, where the criminal was taken in the fact; *simple*, where he was not. The Lacedæmonians never punished larceny provided the person was not caught in the fact; but, on the contrary, it was applauded as a mark of dexterity and address. See *LACEDÆMONIANS*.

The laws of Draco at Athens, which are said to be written in blood, punished it with death; but Solon afterwards changed the penalty into a pecuniary mulct: and so the Attic laws in general continued. By the Jewish law, theft was only punished with a pecuniary fine, and satisfaction to the party injured. (Exod. chap. xxii.) From these examples, as well as the reason of the thing, many learned and scrupulous men have questioned the propriety, if not lawfulness

## LARCENY.

fines, of inflicting capital punishment for simple theft; and proposed either a pecuniary or a corporal punishment. Sir Thomas More in his *Utopia*, p. 42, and more lately the marquis Beccaria, *Ess. on Crimes and Punishments*, chap. xxii. have proposed that kind of corporal punishment, which approaches nearest to a pecuniary satisfaction, *viz.* a temporary imprisonment, with an obligation to labour, first for the party robbed, and afterwards for the public, in works of the most slavish kind: nevertheless the punishment of theft still continues, through the greatest part of Europe, to be capital. Puffendorf (*Law of Nat. l. 8. c. 3*) and sir Matthew Hale (*1 Hal. P. C. 13*.) are of opinion, that this must be always referred to the prudence of the legislature; yet both writers agree, that such punishment should be cautiously inflicted, and never without the utmost necessity. It is observed, that our ancient Saxon laws nominally punished theft with death, if above the value of 12*l.* but the criminal was permitted to redeem his life by a pecuniary ransom: as, among their ancestors the Germans, by a stated number of cattle. (*Tacit. de Mor. Ger. c. 12.*) But in the ninth year of Henry I. this power of redemption was taken away, and persons guilty of great larceny directed to be hanged, which law continues in force to this day. (*1 Hal. P. C. 12. 3 Inst. 53.*) See FELONY. *Petit larceny* by common law is only punishable by whipping or imprisonment. (*3 Inst. 218.*) Or, by 4 Geo. I. c. 11. the punishment may be extended to transportation for seven years; but the punishment of *grand larceny*, or stealing above the value of 12*l.* which sum was the standard in the time of king Athelstan, eight hundred years ago, is, at common law, regularly death: upon which sir Henry Spelman observed, above a century since, when money was at twice its present rate, that while every thing else was risen in its nominal value, and become dearer, the life of man had continually grown cheaper. And though the jury may exercise a kind of unwarrantable clemency, by bringing in larceny under the value of 12*l.* and the benefit of clergy is allowed for the first offence; yet in many cases of simple larceny this is taken away by the statute: as from horse-stealing (*1 Edw. VI. c. 12. 2 & 3 Edw. VI. c. 33. 31 Eliz. c. 12.*), taking woollen-cloth from off the tenters (*Stat. 22 Car. II. c. 5.*), or linen, silks, calicoes, or cotton goods from the place of manufacture (*18 Geo. II. c. 27.*), stealing sheep or other cattle specified in the acts (*14 Geo. II. c. 6. 15 Geo. II. c. 34.*), thefts on navigable rivers above the value of 40*s.* (*24 Geo. II. c. 45.*), plundering vessels in distress, or that have suffered shipwreck (*12 Ann. Stat. 2. c. 18. 26 Geo. II. c. 19.*), stealing letters sent by the post (*7 Geo. III. c. 50.*), and stealing deer, hares, and conies under the circumstances recited in the *Waltham Black act*, *stat. 9 Geo. I. c. 22.*

The Circassians are said to honour theft at this day; inasmuch that at their public feasts, their youth are not suffered to drink, if they have not performed something remarkable in that way. Solinus tells us, that in Sardinia there was a fountain that had the virtue of discovering a person that had committed larceny.

*Compound or mixed larceny* is that, which, besides all the properties of the former, has the aggravation of taking from one's house or person. With respect to larceny from the house, see BERGLARY and HOUSE-BREAKING.

It may be here observed, that the benefit of clergy is denied: 1. In all larcenies above the value of 12*l.* from a church, or from a dwelling-house, or both, any person being therein. 2. In all larcenies to the value of 5*s.* committed by breaking the dwelling house, though no person be therein. 3. In all larcenies to the value of 40*s.* from a dwelling-house, or its out-houses, without breaking in, and

whether any person be therein or no. 4. In all larcenies to the value of 5*s.* from any shop, warehouse, coach-house, or stable, whether the same be broke open or not, and whether any person be therein or no: whether these offences are committed by day or by night.

Larceny from the person is either by privately stealing; or by open and violent assault, usually called *robbery*. The offence of privately stealing from a man's person above the value of 12*l.* as by privately picking his pocket or the like, without his knowledge, was debarred of clergy, so early as by the statute 8 Eliz. c. 14. For the other kind of larceny from the person, see ROBBERY. See also FELONY.

Persons who buy or receive any stolen goods, knowing the same to be stolen, shall be deemed accessaries after the fact; 3 W. c. 9; and by 4 Geo. c. 11. they may be transported for fourteen years: and by 5 Anne, c. 31. such persons, and those who conceal any felons or thieves, shall be deemed accessary to the felony, and being convicted on the testimony of one witness shall suffer death as a felon convicted: but within clergy. If the principal felon cannot be taken, so as to be prosecuted and convicted, yet the buyer and receiver of stolen goods may be prosecuted for a misdemeanour, and punished by fine and imprisonment, or other such corporal punishment as the court shall think fit; which shall exempt him from being punished as accessary, if the principal shall be afterwards taken and convicted. Receivers of stolen lead, iron, copper, brass, bell-metal, and solder, fixed to or being in any houses, out-houses, mills, &c. shall, on conviction by due course of law, and although the principal hath not been convicted, be transported for fourteen years. Suspected places may be searched, and suspected persons may be apprehended, and carried before two justices, and if the person from whom the goods were received be not produced, or some credible witnesses do not depose upon oath the sale or delivery of them, or no satisfactory account of them be given, they shall be adjudged guilty of a misdemeanour. Every person, to whom such goods shall be offered for sale, or to be pawned, shall apprehend the person offering them; and if it shall appear, to the satisfaction of two justices, that such person did not apprehend, &c. the person who brought or offered the same, then he shall be adjudged guilty of a misdemeanour. And persons for the two former misdemeanours, in having or carrying any of the said goods, shall forfeit for the first offence 40*s.*, for the second 4*l.*, and for every subsequent offence 6*l.*; and for not carrying a suspected person before a justice, he shall forfeit for the first offence 20*s.*, for the second 40*s.*, and for every subsequent offence 4*l.* (*29 Geo. II. c. 30*) By 21 Geo. III. c. 69 every person who shall buy or receive any pewter pot or other vessel, or any pewter, knowing the same to be stolen or unlawfully come by, or shall privately buy or receive any stolen pewter, he shall, though the principal person be not convicted, be transported not exceeding seven years, or detained in prison and kept to hard labour not more than three years nor less than one; and within that time be once or oftener, but not more than thrice, publicly whipped. Persons offering for pawn or sale goods suspected to be stolen, may be seized and conveyed by a constable or other peace officer before a justice, who may commit them for any time not exceeding six days for examination, and afterwards, if the goods were stolen or clandestinely obtained, to the common gaol or house of correction. (*30 Geo. II. c. 24*) Persons advertising a reward for helping to stolen goods, and also the printer and publisher of such advertisement, shall respectively forfeit 50*l.* with costs (*25 Geo. II. c. 36*.) And by 4 Geo. c. 11. those who receive such reward, without apprehending the felon and bringing

him to trial, shall be guilty of felony in the same manner as if they had stolen the same. The charges of prosecution and conviction, in respect of any grand or petit larceny, may, by order of court, and at the prayer of the prosecutor, be paid by the county treasurer, with a reasonable allowance for his time and trouble. (25 Geo. II. c. 36.) And by 18 Geo. III. c. 19. the same charges shall be allowed to the prosecutor, whether the person tried be convicted or acquitted, provided that in this latter case it shall appear to the court that there was reasonable ground of prosecution, and that the prosecutor had *bona fide* prosecuted. And by 27 Geo. II. c. 3. 18 Geo. III. c. 19. reasonable charges may be allowed and paid in the same manner, to a poor person who is required to give evidence: in Middlesex these charges shall be paid by the overseers of the poor where the person was apprehended. It is provided by statute, that every person who shall apprehend any one guilty of house-breaking or private stealing, to the value of 5s. and prosecute him to conviction, and all the executors or administrators of a person slain in endeavouring to apprehend a house-breaker or felon, shall have a certificate without fee, under the hand of the judge, certifying such conviction, &c. which certificate shall be enrolled by the clerk of the peace of the county where it is granted, and may be once assigned over and no more. By virtue of this certificate the original proprietor, or assignee of the same, shall be discharged from all parish and ward offices, within the parish or ward where the felony was committed. (10 & 11 W. c. 23.) Every such person, and also the executors and administrators of a person killed as before, shall also have another certificate, which, on being tendered to the sheriff, and demand made, shall entitle him to the sum of 40*l.* without fee, in one month after the tender and demand; on pain of forfeiting double with treble costs. (5 Anne, c. 31.) See *DISCOVERY of Accomplishes*.

The sheriff, on producing the certificates and the receipts for the said rewards, may deduct the same from his accounts; and if he have not money in his hands, he shall be repaid out of the treasury, on certificate from the clerk of the pipe; or he may immediately apply to the commissioners of the treasury, who shall pay the same without fee. 3 Geo. c. 15.

**LARCH-TREE**, *Larix*, in *Botany*. Linnæus refers this to the genus of pine. See *PINUS Larix*.

It is the common name of a kind of pine or fir tree, the leaves of which are long and narrow, and are produced out of little knots or tubercles, in the form of a painter's pencil; the cones are produced at remote distances from the male flowers on the same tree; the flowers are very like small cones at their first appearance, but afterwards stretched out in length. These trees are propagated by seeds, which should be sown in the beginning of March, upon a bed of light soil, exposed to the morning sun only; or they may be sown in pots or boxes of light earth, and placed near a hedge, where they may be exposed to it. The seed should be covered about half an inch thick with fine light earth, and in very dry weather should be gently refreshed with water. In about six weeks, if the seeds be good, the plants will come up, at which time they should be carefully guarded against rapacious birds, which would otherwise pull off the heads of the plants, as they thrust themselves out of the ground with their covers on them; and refresh them with water in dry weather, especially if they are sown in pots or boxes; also keep them clear from weeds, which, if suffered to grow among the young plants, will soon destroy them. In October, if they are in boxes or pots, remove them into a situation where they may be defended from sharp winds,

which are sometimes hurtful to them, while young; but afterwards they will endure the severest weather of our climate. These trees are very proper for the sides of barren hills, where few other sorts will thrive so well; nor are they very delicate in regard to soil, but will grow much better on poor, strong, stony land, than in rich ground; during the summer, they appear very beautiful; but in autumn they cast their leaves, and are not evergreen like the fir.

It has been observed in the fifth volume of the *Annals of Agriculture*, that "larch wood is possessed of so many valuable qualities, that to enumerate the whole would appear an extravagant hyperbole. It is known to resist water, without rotting, almost for ever. The piles of larch timber on which the houses of Venice were built many hundred years ago, when examined, are still found as fresh as when first put in. And he has been told, stakes of it have been tried in the decays of Lincolnshire, which, between wind and water, have already out-worn two or three sets of oak stakes, and do not yet discover any symptoms of decay. It is as far known to possess the valuable quality of neither shrinking nor warping, when put into work; nor is it liable to be pierced by worms in our climate, as many of the paintings of Raphael Urban, which are done on this wood, and are still perfectly entire, sufficiently prove. Experiments have not yet ascertained whether it will resist the sea-worm in tropical climates, like the Bermuda cedar; but there is reason to think it would, as, in many of its other properties, it resembles that wood very much. Along with these valuable properties, it is known to be one of the quickest growing trees in this climate, remarkably hardy, and extremely beautiful when growing. It is, besides, much more easily reared than the oak, and could be spread over a great extent of mountains, if sufficiently bare of herbage, at least to no expense, by the natural shedding of its seeds, like birch or fir in soils that favour them, merely by keeping out cattle from those fields in which small clumps of this kind of wood had been planted some years before. In this way very extensive tracts in the condition just described might be entirely filled with this valuable timber. The uses to which it might be applied are innumerable. It would be valuable not only for ship-plank, but even crooked timbers might be obtained by using a little art, when young, to bend it, as the Bermudians do their cedar; for flood-gates in navigable canals and wet-docks it would exceed every thing that can be obtained in this climate. For barrel-staves it would be inimitable, and would enable us to furnish that article as cheap as any other nation whatever; and in building it would answer all the purposes to which fir is now applied, being much stronger and more durable than that wood. And when it is also adverted to, that it is next to incombustible, the reader will not think it strange that he in this manner so strongly recommends it to the attention of his countrymen, particularly those in the most rugged and barren districts; for, in such situations, it would be easy to shew, that, at a very trifling charge, they might, in a short period of years, bring their estates to a hundred times the value they bear at present, or even can be made to bear by any other kind of improvement. This would be a much more eligible plan of bettering their fortunes than that of trying to squeeze, with difficulty, from a poor people, a raised rent, for a subject that does not admit of proportionable improvement. See *PLANTING*.

The common cone-bearing larch-tree grows naturally upon the Alps and Apennines, and has been lately much propagated in England. Those trees raised from seeds thrive best in the worst soil and situation. There are two varieties of this tree, one of which is a native of America, and

and the other of Siberia; neither of which thrive well in this climate. In Switzerland the wood of the common larch-tree is used for building and covering the houses; and in other countries, where it abounds, it is preferred for every purpose to all the kinds of fir. In many places there are ships built of this wood, which are said to be durable; and, therefore, this may be a very proper tree for planting upon some of the cold barren hills in many parts of England, which, besides the profit they would yield to their proprietors, would also conduce to national benefit. The Venetian turpentine is extracted from the larch-tree. See TURPENTINE.

LARCIE, in *Geography*, a town of France, in the department of Corrèze, and chief place of a canton, in the district of Brives. The place contains 536, and the canton 6679 inhabitants, on a territory of 135 kilometres, in nine communes.

LARCIANO, a town of Etruria; five miles S. of Pistoia.

LARDNER, NATHANIEL, in *Biography*, was born at Hawkherif, in the county of Kent, on the 6th of June, 1684. He probably received his grammatical learning at Deal, which was his father's residence, and where he was pastor of a congregation of Protestant Dissenters; and from school he was removed to a dissenting academy in London, under the care of the Rev. Dr. Joshua Oldfield; but after staying here a short time, he was sent, in the year 1699, and when he was only in his sixteenth year, to prosecute his studies at Utrecht, under professors D'Uries, Graevius, and Burman. In his journey he was accompanied by Mr. Martin Tomkins, and on their arrival they found there Mr. Daniel Neal. After spending somewhat more than three years at Utrecht, Mr. Lardner removed to Leyden, where he studied about six months. In 1703, he returned to England, and from this time to 1709, we have no memorials concerning him. In the last mentioned year he preached, for the first time, at Stoke Newington, from the words of the Apostle Paul, "For I am not ashamed of the gospel of Christ," &c. "There could not," says his biographer, the excellent Dr. Kippis, "have been a more proper text, for a man who was destined, in the order of divine providence, to be one of the ablest advocates for the authenticity and truth of the Christian revelation that ever existed." In 1713, Mr. Lardner undertook the tuition of Mr. Brindley Treby, son of sir George Treby, knight, late lord chief justice of the common-pleas. Having conducted the studies of the young man, about three years, in lady Treby's house, where he was domestic chaplain, he accompanied him in an excursion into France, the Austrian Netherlands, and the United Provinces, which employed them about four months. It does not appear how long his connection, in lady Treby's family, as tutor, lasted, but he continued to reside in the house till the died, in 1721. In 1723, Mr. Lardner was engaged with a number of ministers, in carrying on a course of lectures, on a Tuesday evening, at the Old Jewry. The gentlemen who conducted these lectures preached a course of sermons on the evidences of natural and revealed religion. The proof of the credibility of the gospel history was assigned to Mr. Lardner, and he delivered three sermons on this subject, which probably laid the foundation of his great work, as from this period he was diligently engaged in writing the first part of the *Credibility*. In 1727, he published, in two volumes octavo, the first part of "The *Credibility of the Gospel History*; or the facts occasionally mentioned in the New Testament, confirmed by passages of ancient authors who were contemporary with our Saviour, or his Apostles, or lived near their time." This has been esteemed by persons of all parties an invaluable performance, that has rendered the most essential service to the cause of

Christianity. It has passed through several editions. In the year 1728, Mr. Lardner's life was long despaired of, by the attack of a violent fever, from the effects of which he slowly recovered. With all his great merit, Mr. Lardner, desirous of a settlement as a dissenting minister, did not receive an invitation for this purpose till he was 45 years of age. It was in 1729 he became assilant to Dr. Harris, minister at Crutched or Crouched Friars. About this period he published "A Vindication of three of our blessed Saviour's Miracles; viz. The Raising of Jairus's Daughter, The Widow of Nairn's Son, and Lazarus," in answer to Mr. Woolston's attack on the scripture account of Christ's miracles. In 1733, appeared the first volume of the second part of "The *Credibility of the Gospel History*;" this volume comes down to the year 178, and is prefaced by an introduction, giving a clear and very luminous history of the New Testament. It was immediately translated into the Low Dutch and Latin languages. The second volume was published in 1735, and concludes the author's remarks out of Christian writers of the second century. In 1736, he was attacked with another dangerous fever, the effects of which prevented him from preaching for several months. In 1738, Mr. Lardner published the third volume of the second part of "The *Credibility*," ending with the year 233; in 1740, the fourth volume, which comes down to the year 248; and, in 1743, he published the fifth volume, which concludes with the year 306. About the same period he sent into the world another performance, entitled "The Circumstances of the Jewish People, an Argument for the Truth of the Christian Religion, in three Discourses." He brought out the remaining volumes of "The *Credibility*," at intervals between this period and the year 1755, and in the next two years he added to this great and valuable work a supplement, in three volumes, comprising a history of the apostles and evangelists, with remarks and observations upon every book of the New Testament. Our author, on account of his very high merit as a writer, had, in 1745, received a diploma, conferring upon him the degree of doctor of divinity. In the year 1751, he resigned the office of preacher at Crutched Friars, having, during the preceding year, published a volume of Sermons, the subjects of which are entirely of a practical nature; and, in 1760, he gave the world a second volume of these sermons. He had also published many other smaller pieces which were well received by the public; such was a sermon entitled "The Counsels of Prudence, for the Use of young People," for which he was thanked by Dr. Secker, at that time bishop of Oxford. The discourse has been very frequently printed, and has at the present moment a large sale. Lardner had also published "A Dissertation upon the two Epistles ascribed to Clement of Rome, &c.;" "An Essay on the Mosaic Account of the Creation and Fall of Man;" "The Case of the Demoniacs, mentioned in the New Testament;" "A Letter to Jonas Hanway, Esq.," to shew that Mary Magdalen was not the sinner mentioned in the seventh chapter of St. Luke's gospel, but a woman of distinction and excellent character, who for a while laboured under bodily indisposition, which our Lord miraculously healed; and that, therefore, houses intended for the reception of penitent prostitutes, ought not to be denominated Magdalen houses. In 1762, he published "Remarks on the late Dr. Ward's Dissertations on several Passages of the sacred Scriptures;" to which succeeded, in 1764, "Observations upon Dr. Macknight's Harmony, so far as related to our Saviour's Resurrection." Amidst these various productions of a smaller nature, Dr. Lardner continued the prosecution of his grand object, and in the last mentioned year he gave the world the first volume of "A large Collection of ancient Jewish and Heathen Testimonies

"Testimonies to the Truth of the Christian Religion," comprising the Jewish and Heathen authors of the first century. The remaining three volumes were published in intervals between this and the close of the year 1767, and in them the biblical student is presented with a noble treasure of curious and valuable information, and of able and judicious criticism, for which the Christian world is deeply indebted to the author. They complete the grand design which had occupied a large portion of forty-three years of Dr. Lardner's valuable life; and by them, though far from profitable, he has raised a monument to his fame, which can never perish. Dr. Lardner lived to a very advanced age, and with the exception of his hearing, retained the use of his faculties to the last, in a remarkably perfect degree. In the year 1768, he fell into a gradual decline, which carried him off in a few weeks, at Hawkehit, his native place, at the age of eighty-five. He had, previously to his last illness, parted with the copy-right of his great work for the miserable sum of 150*l.* but he hoped if the booksellers had the whole interest of his labours, they would then do their utmost to promote the sale of a work that could not fail to be useful in promoting the interests of his fellow creatures, by promulgating the great truths of Christianity on a rational foundation. After the death of Dr. Lardner, some of his posthumous pieces made their appearance; of these the first consist of eight sermons, and brief memoirs of the author. In 1776, was published a short letter, which the doctor had written in 1763, "Upon the Personality of the Spirit." It was part of his design, with regard to "The Credibility of the Gospel History," to give an account of the heretics of the first two centuries. In 1780, Mr. Hogg of Exeter published another of Dr. Lardner's pieces, upon which he had bestowed much labour, though it was not left in a perfect state; this was "The History of the Heretics of the first two Centuries after Christ, containing an Account of their Time, Opinions, and Testimonies to the Books of the New Testament; to which are prefixed General Observations concerning Heretics." The last of Dr. Lardner's pieces was given to the world by the late Rev. Mr. Wiehe, then of Maidstone in Kent, and is entitled "Two Schemes of a Trinity considered, and the Divine Unity asserted;" it consists of four discourses; the first represents the commonly received opinion of the Trinity; the second describes the Arian scheme; the third treats of the Nazarene doctrine; and the fourth explains the text according to that doctrine. This work may perhaps be regarded as supplementary to a piece which he wrote in early life, and which he published in the year 1759, without his name, entitled "A Letter written in the Year 1730, concerning the Question, Whether the Logos supplied the Place of the Human Soul in the Person of Jesus Christ;" in this piece his aim was to prove that Jesus Christ was, in the proper and natural meaning of the word, a man, appointed, anointed, beloved, honoured, and exalted by God, above all other beings.

For the many testimonies given of Dr. Lardner's character, the reader must be referred to Kippis's life, prefixed to a complete edition of his works, published in 1788, in eleven very large volumes, by the late J. Johnson. One or two only shall be quoted in this place. "The name of Lardner is well known in the literary world. No writer, from the very excellence of Christianity, ever conferred so essential service upon true religion, or contributed more to clear up its evidence and elucidate its antiquities. Accordingly, there is no country, where the Christian religion is professed, in which his name is not held in the greatest esteem. Every church would have been proud to boast of him as their member, and his voluminous productions

have been translated into almost all the languages of Europe."

"Dr. Lardner," says his most excellent biographer, "may be held out, in particular, as a fine example to those of his own profession. As the Dissenters had the honour of producing Dr. Lardner, he will naturally be the object of emulation to the dissenting clergy." They will so far look up to him as their pattern, as to endeavour to qualify themselves for appearing, when occasions call for it, in the great departments of literature, and especially in the cause of religious truth and liberty, and in defence of the sacred writings."

The piety of Dr. Lardner was sincere and ardent; it was the governing principle of all his actions, and founded on just and enlarged views concerning the nature of religion. The love of truth appears manifestly in all his works; and no one ever seems to have preserved a greater impartiality in his enquiries, or to have been more free from any undue bias. He followed truth wherever it led him; and for the attainment of it he was admirably qualified, both by the turn of his disposition and his understanding. The candour and moderation with which he maintained his own sentiments, constituted a prominent feature of his character. Benevolence, as well as piety, entered deeply into Dr. Lardner's character; he was ready to promote every good work; and to persons in distress he was ever willing to contribute, to the highest degree which his fortune would admit. His manners were polite, gentle, and obliging; and he was attentive in every respect to the laws of decorum.

We may observe, that Dr. Lardner's great works were unquestionably indebted for Dr. Paley's "View of the Evidences of Christianity;" nor is it too much to say that if the former had not been published, the latter, probably, would never have appeared; and justice requires us to add, that sufficient acknowledgments were not made for the assistance which was derived from the labours of the excellent Lardner. It must, however, be admitted, that the deficiencies of the amiable Paley have been supplied by his biographer Mr. Meadley; who, in speaking of his "View of the Evidences of Christianity," which appeared in 1794, in three volumes, 2*mo.* but which have in all subsequent editions been printed in two volumes, 8*vo.* Mr. Meadley says, "the direct historical testimony for the authenticity of the Christian revelation, already adduced by the indefatigable Lardner, is admirably selected and arranged in this important work; and the general argument drawn up with great clearness and felicity. The most striking of those collateral proofs of the credibility of the gospel history, produced by the same writer, are also here again presented, in a novel and impressive manner, and established by auxiliaries of a different kind." Of Dr. Paley's works, and of his motives in the publication, too high eulogiums cannot be paid, and it is to be regretted that in his preface he had not acknowledged his obligations to our author. Paley's View is capital as an abridgment of Lardner, Douglas, &c. and his work has been twice, at least, abridged or analysed; one of these abridgments was published at Cambridge in 1795, and another in London in 1810. Lardner's Works, and Life by Kippis; Meadley's Life of Dr. Paley; and private information.

LARE, in *Geography*, a town of the principality of Georgia, in the province of Carduel; 80 miles S. of Teflis.

LARE Point, a cape on the E. coast of Madagascar. S. lat. 16° 40'.

LAREDO, a sea-port town of Spain, in the province of Biscay, with a good harbour, in a gulf of the same name; 20 miles E. of Santander. N. lat. 43° 25'. W. long. 3° 21'.

LAREK,

LAREK, or LARESH, a small island in the Persian gulf; the soil of which is bad and the water brackish. The Persians have prevented the attempts of the Dutch for settling a factory in this island; 12 miles S.S.E. of Gambron. N. lat. 26° 50'. E. long. 56° 38'.

LARENDEBA, a town of Asiatic Turkey, in Carmania; 40 miles S.S.E. of Cogni.

LARENSIS, in *Ancient Geography*, an episcopal see of Africa, in the Proconular province.

LARENTIALIA, in *Antiquity*, a feast held among the Romans on the 23d day of December, but ordered to be observed twice a year by Augustus; by some supposed to have been in honour of the Lares, but by others, with more probability, in honour of Acca Laurentia; and to have been the same with Laurentalia.

LA REOLA, in *Geography*. See *La REOLA*.

LARES, among the *Ancients*, derived by Apuleius, De Deo Socratis, p. 689, from *lar, familiaris*; a kind of domestic genii, or divinities, worshipped in houses, and esteemed the guardians and protectors of families; supposed to reside more immediately in the chimney corner.

The Lares were distinguished from the Penates, as the former were supposed to preside over house-keeping, the servants in families, and domestic affairs; and the latter were the protectors of the masters of families, their wives and children: accordingly, the Lares were dressed in short succinct habits, to shew their readiness to serve, and they held a sort of cornucopia in their hands, as a sign of hospitality and good house-keeping. According to Ovid there were generally two of them, who were sometimes represented with a dog at their feet. *Fast.* v. 146.

Plutarch distinguishes good and evil Lares, as he had before done good and evil Genii.

There were also some public, others private Lares.

Apuleius tells us the domestic Lares were no more than the souls of departed persons, who had lived well, and discharged the duties of their station; whereas, those who had done otherwise, were vagabonds, wandering about, and frightening people, called *Larvæ* and *Lemures*; which see.

The Lares were also called *Penates*, and were worshipped under the figures of little marmosets, or images of wax, silver, or earthen-ware.

The public Lares were also called *Compitales*, from *compitum*, a cross-way; and *Viales*, from *via*, a way, or public road; as being placed at the meetings of roads, and in the highways, and esteemed the patrons and protectors of travellers.

Their private Lares took care of particular houses and families: these they also called *Præsitæ*, from *præsitæ*?

“Quod præstant oculis omnia tuta suis.” Ovid. *Fast.*

They gave the name *Urbani*, i. e. Lares of cities, to those who had cities under their care; and *Hospitalis*, to those who were to keep their enemies off. There were also Lares of the country, called *Rurales*, as appears by several antique inscriptions.

The Lares were also genii gods, and were supposed to take care of children from their birth. It was for this reason that when Macrobius tells us the Egyptians had four gods who presided over the birth of children, *viz.* the Genii, Fortune, Love, and Necessity, called *Præsitæ*, some interpret him as if he had said, the Egyptians had Lares; but they have mentioned that there was a great difference between the Lares of the Romans, and the *Præsitæ* of the

Egyptians. However, the learned Mr. Bryant affirms that they were the same.

The ancients differ extremely about the origin of the Lares. Varro and Macrobius say, that they were the children of Mania: Ovid makes them the issue of Mercury, and the naiad Lara, whom Lactantius and Aufonius call *Larunda*; Apuleius assures us they were the posterity of the Lemures; Nigidius, according to Arnobius, made them sometimes the guardians and protectors of houses, and sometimes the same with the Curetes of Samothracia, which the Greeks call *Idei dætyli*. Nor was Varro more consistent in his opinion of these gods; sometimes making them the names of heroes, and sometimes gods of the air.

T. Tatius, king of the Sabines, was the first who built a temple to the Lares. The chimney and fire-place in the house were particularly consecrated to them.

Tertullian tells us the custom of worshipping the Lares arose from this, that they anciently interred their dead in their houses; whence the credulous people took occasion to imagine their souls continued there also, and proceeded to pay them divine honours. To this it may be added, that the custom being afterwards introduced of burying in the highways, they might hence take occasion to regard them as gods of the highways.

The victim offered to the Lares, in the public sacrifices, was a hog: in private, they offered them wine, incense, a crown of wool, and a little of what was left at the table. They also crowned them with flowers, particularly the violet, myrtle, and rosemary. Their symbol was a dog, which was usually represented by their side, on account of its fidelity, and the service it does to man, in watching his house. They were sometimes also represented as clothed in a dog's skin.

See farther on the Lares, in Arnobius, Lactantius, Augulline de Civit. Natalis Comes, Lambin. on Plaut. *Aul.* and on Hor. *Casaubon* on Sueton. &c.

The term Lares, according to Mr. Bryant, was formed from *laren*, an ancient word by which the ark was represented; and he supposes that the Lares and Manes were the same domestic deities under different names; and that by these terms the Etrurians and Latins denoted the *dii arkitæ*, who were no other than the arkite ancestors, or the persons preserved in the *laren* or ark; the genius of which was Isis, the reputed parent of the world. He observes farther, that they are described as dæmons and genii, who once lived on earth, and were gifted with immortality. Arnobius, lib. iii. p. 124. styles them *Lares quosdam genios & sanctorum animas*; and he says, that according to Varro de Ling. Latin. lib. viii. p. 113, they were the children of Mania. Huëtius *De monst. Prop.* 4. p. 139. adds, that Mania had also the name of Larunda; and she is styled the mother of the dæmons. By some she is called Lara, and was supposed to preside over families; and children were offered at her altar in order to procure her favour. Macrobi. *Sat. lib. i. c. 7. p. 154.* In lieu of these they in aftertimes offered the heads of poppies, and pods of garlick. *Anal. of Ancient Mythol.* vol. ii. p. 449, &c.

The pantheons, or images representing several gods at once, were also called Lares. Harpocrates was one of these.

LARES, or *Laris*, in *Ancient Geography*, a town of Africa Propria, according to Ptolemy, who places it in the territory of Circha.

LARG, in *Geography*, a small island near the W. coast of Sumatra. S. lat. 3° 30'. E. long. 100° 3'.

**LARG Fell**, a mountain of Scotland, in the county of Kirkcubright; 13 miles W. of New Galloway.

**LARG Kirk**, a town of Scotland, in the county of Sutherland; 18 miles N.W. of Dornock.

**LARGA**, a small island in the Spanish Main, near the coast of South America. N. lat.  $10^{\circ} 11'$ . W. long.  $76^{\circ} 6'$ .

**LARGE**, a *Sea Term*, applied to the wind, when it crosses the line of a ship's course in a favourable direction, particularly on the beam or quarter. Thus, if a ship steer well, then the wind in any point of the compass to the eastward of the fourth or north, may be called *large*, unless when it is directly east, and then it is said to be right aft. *Sailing large*, is, therefore, advancing with a large wind, so as that the sheets are slackened and blowing, and the bow-lines entirely difused. This phrase is generally opposed to *sailing close-hauled*.

**LARGE**, in the *Mennege*. A horse is said to go large, or wide, when he gains or takes in more ground in going wider from the centre of the volt, and describing a greater circumference. To make a horse go large, you must give him the aid of your inner heel. See ENLARGE.

**LARGE**, synonymous with *maxima*, the longest note in the first time table, equal to two *longs*, four *breves*, and eight *semibreves*. Its form is an oblong square, with a tail on the right side, thus . See CHARACTER.

**LARGE River**, in *Geography*, a river of Louisiana, which runs into the Mississippi. N. lat.  $38^{\circ} 25'$ . W. long.  $95^{\circ} 7'$ .

**LARGENTIERE**, a town of France, in the department of the Higher Alps, and chief place of a canton, in the district of Briançon. The place contains 978, and the canton 5871 inhabitants, on a territory of  $462\frac{1}{2}$  kilometres, in 7 communes.

**LARGENTIERE**, a town of France, and chief place of a district, and seat of a tribunal, in the department of the Ardèche: 18 miles W. of Privas. The place contains 1006, and the canton 9543 inhabitants, on a territory of  $177\frac{1}{2}$  kilometres, in 14 communes. N. lat.  $44^{\circ} 32'$ . E. long.  $4^{\circ} 42'$ .

**LARGHETTO**, *Ital.* the diminutive of *largo*.

**LARGO**, in the *Italian Music*, a slow movement, one degree quicker than *adagio*, and two than *grave*. See TIME.

*Resoluto* makes *largo* flow in the first degree; but we think erroneously. *Adagio* is the slowest time in Corelli, and all the old masters; *grave* the second; and *largo* the third. In *adagios* and *largos*, the time is usually counted by quavers, and in *grave* by crotchets.

**LARGO Gulf**, in *Geography, a bay on the coast of Istria, near Trieste.*

**LARI**, a town of Etruria; 10 miles E. of Leghorn.

**LARIBUS COLONIA**, in *Ancient Geography*, *Laribus*, a Roman colony in Africa, situated on an eminence, five leagues N.E. from Siaca.

**LARICAXAS**, a province of South America, in the government of Buenos Ayres, about 240 miles from E. to W., and 75 from N. to S. Its climate varies in different parts, and its products are the same with those of Carabaya, which terminates it northward. It abounds in gold mines, the metal being 23 carats and 3 grains fine. The celebrated mountain of Su. bulli in this province, about half a century ago, yielded old in great quantity of this standard, but its mine was overflowed, and no labour could recover it.

**LARICE**, in *Ancient Geography*, the name given by Ptolemy to the province of India, now called Guzerat.

**LARICOT**, *Fr.* an acute stop in the organs of France, a 3d above the major 17th, and an octave above the 12th in our organs, which would be a 19th above the diapason.

**LARIK**, in *Geography, a town of Asiatic Turkey, in the government of Sivas; eight miles N.N.E. of Amahel.*

**LARINO**, a town of Naples, in the Molise; the see of a bishop, suffragan of Benevento; 25 miles N.E. of Milife. N. lat.  $41^{\circ} 47'$ . E. long.  $14^{\circ} 50'$ .

**LARINUM**, in *Ancient Geography*, *Larino*, a town of Italy, in Sannium, towards the south; it had the title of municipal.

**LARIO**, in *Geography, a department of Italy, occupying the whole of the W. coast of the lake of Como, anciently "Larius lacus." Its population amounts to 137,264 persons, who elect 12 deputies. The capital is Como.*

**LARIOZO**, a town of the island of Cuba; 48 miles E. of Spirito Santo.

**LARISSA**, in *Ancient Geography, a town of Thessaly, upon the right bank of the Peneus, 10 miles above Atrax, E. of the mouth of the Apidanos or the Peneus, 44 miles from Demetrias, and 24 from Diium. Acrisius, king of Argos, retired to this town, in order to avoid the death which the oracle had menaced; but taking a part in the games which were celebrated in this place, he was killed by a stroke of the diletus of Perseus. Larissa always maintained a distinguished rank among the towns of Thessaly; but it declined from the time of Lucan. However, it still subsists under the same name in European Turkey, near the celebrated mount Olympus, and is inhabited by Christians, Turks, and Jews; the former having an archbishop and several churches; and the Turks having several mosques. The number of inhabitants is estimated at about 25,000.*

Its situation, on an eminence, is pleasant. By the Turks it is called *Genijahar* or *Janzijehabir*. N. lat.  $39^{\circ} 45'$ . E. long.  $22^{\circ} 29'$ .—**ALIO**, a town of Eolia, in Asia Minor, situated E. of Phocæa and S.E. of Cyre, forming with these two towns the vertex of a triangle. Xenophon calls it the Egyptian Larissa, because it was one of the towns which Cyrus, the first king of Persia, gave to the Egyptians.—**ALIO**, a town of Asia, on the banks of the Tigris. Xenophon says, that it had been large, but deserted, and that it had anciently been under the dominion of the Medes.—**ALIO**, a town of Triphylia, in the northern part, upon the river Larissus, near the frontiers of Arcadia.—**ALIO**, a town of Crete, according to Strabo.—**ALIO**, a town surnamed *Cremossis*, according to Strabo; who says, that it was called Pelagisa, though situated out of the Pelagian territory. Livy places it on the sea-coast, between Echinus and Antron. Eulathius and Porphyrogenitus say, that it had been anciently called Argos.—**ALIO**, a town of Italy, in Campania; said to be built by the Pelagians, but deserted and ruined in the time of Dionysius Halicarnassus.

**LARISTAN**, a small province of Persia, formerly a kingdom conquered by Abbas the Great, in 1612; bounded on the N. and E. by Kerman, on the S. by the Persian gulf, and on the W. by Farlatan or Fars, of which some have regarded it as a part. The subdivision seems not to have been known in ancient times, though the long ridge of mountains on the S. of Fars, and generally about 60 British miles from the Persian gulf, naturally indicates a maritime province; which, if the ancient Persians had been addicted to commerce, would have been the seat of great wealth by intercourse with Arabia, Africa, and India. But the Persians were high-spirited horsemen and warriors, totally averse from maritime enterprize, either of war or trade, from a contempt of the Arabian fish-eaters on their coast, or more probably, from particular precepts of Zoroaster, the founder of their faith, which rendered a maritime life incompatible with the practice of their religion. The air of this province

is insalubrious, and varies frequently from extreme heat to extreme cold; water fit for use is scarce; that which is drunk being found, as it is said, to breed worms in the legs and thighs of those who use it. Camels are the principal articles of trade. The capital is *Lar*, which see.

LARIX, in *Botany*, an ancient Latin name, the Larch. See PINUS. The older botanists distinguished *Larix* as a genus by its fuciated leaves, but no difference is discoverable in the fructification, at least between it and *Abies*, which all Linnean botanists refer to *Pinus*. Jussieu keeps the two latter distinct, and hints at separating *Larix*.

LARK, in *Ornithology*. See ALAUDA.

LARK, *Sea*. See CHABADRIUS *Hiaticula*.

LARK'S POINT, in *Geography*, a cape on the coast of Canada, on the river St. Lawrence, at the mouth of the Saguenay river.

LARKENTING, a town of Thibet; 55 miles E.N.E. of Tchiatam.

LARKSPUR, in *Botany*. See DELPHINIUM.

LARMIER, *Fr.* in *Architecture*, the same as *Corona*; which see.

LARNE, in *Geography*, a sea-port and post-town of Ireland, in the county of Antrim. It is situated on the north-western extremity of Larne Lough, and has a good yarn market once a month. There are great salt-works here, and its exports consist of salt, lime, limestone, and some provisions. It is 97 miles N. by E. from Dublin. N. lat. 54° 51'. W. long. 5° 44'.

LARNE Lough, a bay on the east coast of the county of Antrim, Ireland, called Oldfleet haven by Boate, and Wolderfrith in the enumeration of the havens by Stanburft. It is formed by the peninsula called Island Magee, and is said by M'Kenzie to be a small but safe harbour, where vessels that draw not above ten feet water may ride on clean good-holding ground. It is about six miles long and one wide.

LARNIC, or LARNICA, a sea-port town on the coast of the island of Cyprus, the see of a Greek bishop, and the residence of several European consuls. The Turks have a mosque, and the Greeks have three churches. It is now a poor place, though the roadstead is good; 30 miles S.W. of Famagosta.

LARNTUKA, or LARUNTUKA, a sea-port town on the S. side of Ende, one of the Molucca islands, with a good harbour. S. lat. 8° 15'. E. long. 123° 57'.

LAROA, a town of Hindoostan, in Guzerat; 10 miles E. of Baroach.

LAROCHE, a town of France, in the department of the Sambre and Meuse, and chief place of a canton, in the district of Marche. The place contains 1006, and the canton 6167 inhabitants, on a territory of 250 kilometres, in 20 communes.

LAROS, a town of Turkish Armenia, on the coast of the Black sea; 18 miles S.W. of Gonieh.

LAROTAVA, a town of the island of Teneriffe.

LAROW, a town of Hindoostan, in Bahar; 10 miles S. of Gayah.

LARRAGA, a town of Spain, in Navarre; 11 miles E. of Estella.

LARRASOANNO, a town of Spain, in Navarre; 12 miles N.E. of Pamplona.

LARREA, in *Botany*, named by Cavanilles, in honour of Don John Anthony Hernandez de Larrea, dean of Saragossa, a liberal encourager of chemistry, botany, and agriculture. The author had, in his fourth volume of *Icones*, p. 63, suppressed this name, given by his countryman Ortega to another genus, and had changed it to *Hoffmannia*;

being then, as it seems, not so sensible of the dean of Saragossa's botanical merits as he afterwards became.—Cavan. Ic. v. 6. 39.—Class and order, *Decandria Monogynia*. Nat. Ord. *Grinales*, Linn. *Rutaceae*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five ovate, concave, rather unequal, deciduous leaves. *Cor.* Petals five, equal, ovate, with claws. *Stam.* Filaments ten, rather shorter than the corolla, awl-shaped, equal, each furnished at its base, on the inside, with a cloven scale, applied close to the germin; anthers heart-shaped, erect, simple. *Pist.* Germen superior, globose, with five deep furrows; style awl-shaped, with five angles, nearly equal to the stamens; stigma simple. *Peric.* Drupes five, dry, cohering by their acute inner margin, externally convex, of one cell. *Nuts* solitary, ovate-oblong.

Obf. There are the rudiments of several seeds in the young fruit, though only one of them comes to perfection in each nut. The genus comes near *Zygophyllum* and *Pagonia*.

Eff. Ch. Calyx of five leaves. Petals five. Nectary of five cloven leaves, covering the germin. Drupes five, single-seeded.

1. *L. nitida*. Shining-leaved Larrea.—Cavan. Ic. t. 559. Leaves pinnate. Fruit smooth.—Gathered at Buenos Ayres by Louis Née, flowering in April. It has been raised with good success in the garden of Madrid, and we have specimens from Cavanilles himself. The stem is shrubby, nine feet high in its native country, hard, knotty, very much branched, the branches round, rather zig-zag, repeatedly subdivided, spreading, two-ranked, leafy, rough, viscid. Leaves opposite, sessile, twice as long as broad, about half an inch in length, shining, glutinous, smoothish, minutely dotted, each composed of about seven or eight pair of crowded, two-ranked, oblique, sessile, oblong, obtuse, entire leaflets, of which the two uppermost are unequal and very small, looking as if there were an odd one at the end. *Stipulas* opposite, triangular, acute, reddish. *Flowers* axillary, solitary, alternate, deep yellow, on roughish stalks, shorter than the leaves. The *germen* is hairy, though the fruit is naked, or only clothed with fine short down. Its outer coat is coriaceous and rugged. *Nuts* without valves or futures.—The whole plant exudes a copious glutinous resin, of a strong scent, still very powerful in the dried specimens, and intercalars so on their being moistened with proof spirit, which extracts from them abundance of a yellow fetid solution.

2. *L. divaricata*. Spreading-lobed Larrea.—Cavan. Ic. t. 560. f. 1.—Leaves simple, with two deep spreading lobes. Fruit hairy. Found with the former, flowering at the same season. The stem is shrubby, six feet high, with much of the habit of the foregoing; but the leaves are simple, very deeply cloven into two spreading acute lobes. The flowers are yellow, larger than those of *L. nitida*, with obtuse petals; and the fruit is beset externally with long prominent hairs.

3. *L. cumifolia*. Wedge-leaved Larrea.—Cavan. Ic. t. 560: f. 2.—Leaves wedge-shaped, cloven at the end, with an intermediate bristle.—This appears to differ in foliage only from the last, along with which it was found.

These plants promise to be not unworthy of attention for their dyeing qualities. Cavanilles says, ten leaves of the *divaricata*, boiled in a quart of water, with the little branch on which they grew, uted the whole liquid of a deep saffron colour.

LARREY, ISAAC DE, in *Biography*, born of a noble French family in 1638, was brought up to the profession of the law. He acted some time as an advocate in his na-

tive province, but having been educated in the reformed religion, he was obliged to quit his country at the repeal of the edict of Nantes. He went from France to Holland, and obtained the office of historiographer to the States-general. An invitation from the elector of Brandenburg induced him to remove to Berlin, where he died, in 1719, at the age of eighty-one. His principal works are "Histoire d'Angleterre," 4 vols.; "Histoire de Louis XIV." 3 vols. quarto; "Histoire d'Angleterre;" "Histoire des Sept Sages," 2 vols. 1713. Of these his History of England is most esteemed, and was in high reputation on the continent till that of Rapin was published. Larrey was a man of great integrity, zealous for his religion, and warm both in praise and censure, Moreir.

LARRISOUN, in *Geography*, a town of Persia, in the province of Mazanderan; 65 miles S.W. of Fehrad.

LARROQUE, MATTHEW DE, in *Biography*, an eminent French Protestant divine in the 17th century, was born at Leirac, a small city of Guienne, near Agen, in the year 1619. He was educated with a view to the church, and applied himself, in early life, with great diligence to the study of the belles-lettres, philosophy, and theology. Having made great progress in all the various branches of useful knowledge, he was admitted a minister with great applause in the province of Guienne. He was afterwards appointed, by the duches de la Tremouille, minister of the church of Vitre, in Brittany. Here he officiated nearly thirty years, during which time he applied himself most earnestly to the study of the fathers, and Christian antiquities. He was next invited to become both minister and professor of divinity at Saumur: he readily accepted the former office, but declined the latter, not thinking it to be consistent with the course of study in church-history, to which he had a prevalent inclination. Before he could take possession of his office, he received a prohibition from the intendant of the province, forbidding him to enter upon its duties. He therefore continued at Vitre, and employed his time very usefully in composing works of merit. In a short time he received three invitations at once, from three of the most considerable churches in the kingdom, viz. those of Montauban, Bourdeaux, and Rouen. He made choice of the latter, at which place he died in 1684, at the age of sixty-five. His works are numerous, and they acquired for the author a high reputation for real learning, as a theologian. He was a pious and faithful pastor in the church; and in the world an honest man. Moreir.

LARRY-BUNDER, in *Geography*, a sea-port of Hindoostan, in the province of Sindy, on a branch of the Indus, called the Pitti, about 20 miles from the sea. It has a good road for shipping, and the river is navigable for small vessels. The town contains about 100 houses, and is defended by a fort; 48 miles W.S.W. of Tatta. N. lat. 24° 45'. E. long. 66° 42'.

LARRY-BUNDER is also the name of a branch of the Indus; which see.

LARS, a town of Russia, in the government of Caucasus; 56 miles S.E. of Ekaterinograd.

LAKSMO, a small island on the E. side of the gulf of Bothnia. N. lat. 63° 46'. E. long. 22° 39'.

LARVA, in *Natural History*, a name given by Linæus to insects in that state, called by other writers *eruca* or *caterpillar*. See ENTOMOLOGY and INSECTS.

LARVÆ, in *Antiquity*, derived from the Etruscan word *lar* or *lars*, signifying *prince* or *lord*, denoted the ghosts of the deceased, considered as wicked and mischievous. Hence is formed the term *larvatus*, i. e. *larva indutus*, or *demoniac*.

The ingenious Mr. Farmer urges the etymology and use of this term to prove, that the heathen demons were deified human ghosts. The term *lar* was applied not only to their *dæmæstic*, but also to their *collocal* gods, the *dii majorum gentium*, who were all natives of this lower world; and answers to the word *δαιμον*. Quos Græci δαιμονας; noltri, opinor, lares. Cicer. in Timæo. 3. (See LARES.) The larvæ were considered as mischievous spirits; and this author says, that the larvati were demoniacs; but the larvæ, with which they were possessed, were human ghosts; such also as demons were. Ess. on the Demoniacs, p. 27, &c.

The larvæ were also called *lemures*.

LARUCACHI, in *Geography*, a town of Peru, in the diocese of La Paz; 110 miles N. of Chucuito.

LARVIGEN, or LAURWIG, a sea-port town of Norway, in the diocese of Christiania, and capital of a county, deriving from it its name, situated at the conflux of two rivers near the sea. Its trade is considerable, and its iron-works are the most valuable in Norway; 56 miles S.S.W. of Christiania. N. lat. 59° 3'. E. long. 10° 15'.

LARUNS, a town of France, in the department of the Lower Pyrenees, and chief place of a canton, in the district of Oleron; 18 miles S. of Pau. The place contains 1607, and the canton 3855 inhabitants, on a territory of 445 kilometres, in 8 communes.

LARUS, in *Ornithology*, a genus of the order Anseres. In this tribe the bill is straight, acute at the edges, hooked at the tip, and destitute of teeth; the lower mandible gibbous below the point; nostrils linear, broader on the fore part, and placed in the middle of the bill. These are the gulls of English writers, a race of birds very widely diffused throughout the globe, some of the species inhabiting Asia, Africa, and Europe, others Europe, Asia, and America, but the far greater number of species are natives only of the northern regions of America and Europe, as Hudson's bay, Iceland, Greenland, and the north of the European continent, beyond which, towards the southward, their number materially diminishes. Many of the species found in northern latitudes inhabit the British isles, residing on our shores the whole year; others are extremely rare with us, or at least can be considered only as accidental visitors driven from more northern countries in severe winters. The haunts of the gull tribe are the borders of the sea, and marshes immediately in its vicinity, or in the depth of winter they sometimes retire inland, but only into such parts as are abundantly supplied with water, their food consisting principally of fish and worms. The gulls have a light body, the wings long; tongue rather cloven; legs short, naked above the knees, and the hind toe very small. They are very voracious, and when terrified are said to cast up the indigested food they have lately swallowed. The species of this genus are not very clearly discriminated, owing to the variations that prevail in the colours of the plumage in different states of growth, till the birds have attained their third year. This genus is divided into two sections, in the first of which the nostrils are without a cere, and in the other are covered by one.

Species.

\* *Nostrils without a Cere.*

ICTHYÆTUS. Snowy; head entirely, and neck to the middle, deep black; eyelids white. Pallas. *Larus albus*, &c. Oedem. *Die grosse Lachmöve*, Gmel. *Great black-headed gull*.

A native of the borders of the Caspian sea. The size that

## L A R U S.

of the bernacle goose, or larger. The bill is scarlet, with yellow base, the tip yellow with a brown spot; the inside of the mouth red; tail white, even at the end, and reddish brown. This species lays its eggs on the bare sands; the eggs are of an elongated oval form, marked with brown spots intermingled with others pale. When in flight it utters a hoarse cry like that of a raven.

**RISSA.** Whitish; back hoary; quill-feathers white; posterior toe unarm'd. *Larus rissa*, Linn. Gmel, &c. *Larus tridactylus*, Lath. *Kittiwake* Penn. Donovan. Br. Birds, &c.

Length fourteen inches; the bill yellowish; mouth saffron within; head, neck, belly, and tail snowy; wings hoary, the outer edge of the first and tips of the four or five feathers next succeeding white; legs dusky; posterior toe resembling a wart. It varies in sometimes having behind the ear a dusky spot.

This kind of gull inhabits the cliffs on the north coasts of Wales and Scotland, from whence it extends as far as Greenland, Spitzbergen, and Iceland, the arctic coast of Asia, and Kamtschatka. The Icelanders call it Rissa. Fabricius, in his Faun. Groen. describes this as the adult issue of the Tarrock, an affirmation contradicted by some authors and admitted by others, while again some few are of opinion they may be the two sexes of the same species.

**TRIDACTYLUS.** Whitish, back hoary; tips of the tail-feathers, except the outer one, black; feet three-toed. Linn.

**LARUS TRIDACTYLUS** ♂, Lath. *Kauke-gef*, Klein. *Tarrock*, Will. Donovan. Br. Birds, &c.

Frequents the fine rocky coasts of the sea as the former. The eggs, two in number, are greenish-ash, spotted with brown; they are noisy, swim well, and remain on the wing for a considerable time. The flesh and eggs are esteemed by the natives of Greenland, and their skins used as garments. Length fourteen inches; bill and legs dusky; head, neck, and body beneath white; wings varied black and white; tail black at the tip.

In the Bankian collection is a supposed variety of this species exceeding the common tarrock in size, being five inches longer; in this the wings are marked by an oblique black band, and the chin white; the outer tail-feathers entirely white. This inhabits Kamtschatka.

**MINUTUS.** Snowy; head, and beginning of the neck black; back and wings rufes; bill brown-red; legs scarlet. Pallas. Gmel. *La plus petite des mouettes*, Vieill. *Little gull*, Lath.

Size of a thrush; irides blueish; tail equal and white; inhabits near rivers in Siberia and Russia.

**EBURNEUS.** Entirely white; bill and legs lead colour. Gmel. Phipps, &c. *Larus niveus*, Act. Holm. *Larus candidus*, Fabr. Fu. Gr. *La mouette blanche*, Buff. *Rat-sber*, or *Ratzer*, Ray. *Ivory gull*, Arct. Zool.

The length of the species is sixteen inches, the breadth thirty-seven; the bill paler at the tip; wings much longer than the tail; legs lead colour, the claws black. This bird inhabits the Frozen sea between Asia and America. From its fatly gait when walking on the ice, and the strength of its voice, it is said to have obtained the name of *Ratzer*, or Senator. The flesh of the morse constitutes its favourite food; besides which it subsists on worms and fishes. During the summer, it visits the little isles and lakes in the interior, where it forms a nest composed of dried herbage, and lays four eggs of a white colour. The young are spotted with black principally on the back and wings, and the beak is of the same colour.

**CARUS.** White; back hoary; primary quill-feathers,

black at the ends, the fourth and fifth with a black spot at the tip, the outer one black without. Lath.—*Larus Canus*, White, back hoary. Linn. Fn. Succ. *Larus cinereus minor*. *Common sea-mew or mall*, Ray. *White web-footed gull*, Albin. *Common gull*, Arct. Zool. Donovan. Brit. Birds, &c.

Common on the coast of Britain, and in various parts of Europe and America. The length seventeen inches; bill yellow; legs greenish-white, or sometimes reddish. It forms a nest chiefly of sea-weeds; the eggs are large, deep olive, and marked with dark irregular blotches. (Vide Brit. Birds.) This kind of gull extends as far north as Iceland and the Russian lakes, and occurs also on the borders of the Caspian sea, the various shores of the Mediterranean, and those of Greece. Its breeding places are the hollows in rocks and cliffs near the sea.

**HYBERNUS.** Cinereous; beneath snowy; head white, varied with fuscous spots; neck above fuscous; wings varied; tail-feathers white, with a black band.—*Larus Hybernus*, Gmel. *Larus canus* ♂, Lath. *Gavia hyberna*, Brill. *Larus maculatus*, Brun. *Mouette d'hiver*, Buff. *Gnaea-guacu*, Ray. *Winter mew*, *coldly muddy*, Will. Donovan. Brit. Birds. *Winter gull*, Lath. Synop.

Feeds on reptiles and small fishes. This kind is very common in England, and is observed to inhabit farther inland than any other of the gull tribe. In Ind. Orn. of Latham it is described as the young of the foregoing species. Length seventeen inches.

**RUBIBUNDUS.** White; head blackish; bill and legs red. Ed. Nov. Aët. Stockh. *Larus rubibundus*, Linn. *Larus albus erythrocephalus*, Klein. *Brown-headed gull*, Albin. Donovan. Brit. Birds, &c.

Length fourteen to fifteen inches; the eye-lids the same colour as the bill and legs; first ten quill-feathers white, with the edge and tip black. Inhabits Europe and America, and makes a laughing kind of noise. The eggs, three in number, are greenish-brown, spotted with tawny. Gmelin admits two varieties of this species: one of a white colour, with hoary back, and the head and bill blackish, as described by Nozema; the other is white, with blue legs, the bill at the base blue, at the tip yellow. Latham in Ind. Orn. considers as varieties of *rubibundus* the Linnæan *larus cinerarius*, and also *larus erythropus* of Gmel., both which are placed as distinct species in the preceding publication. Gen. Syn.

**MARINUS.** White; back black. Linn. It. Wgoth. *Larus dorjo nigro, palibus rubris*, Ed. *Goeland noir*, Buff. *Great black and white gull*, Ray. *Black-backed gull*, Arct. Zool. Donovan. Brit. Birds, &c.

Native of the maritime parts of Europe and America, the Cape of Good Hope, New Holland, &c. The length twenty-nine inches; the bill yellow, with a red spot near the tip, and in the middle black; quill-feathers black, with the tips white, and the legs flesh-colour. Feeds on fish and young birds.

**NÆVIUS.** White; back cinereous; tail-feathers at the tip black. Gmel. *Wagellus cornubiensium*, Ray. *Wagel gull*, Will., &c. Donovan. Brit. Birds, &c.

This species inhabits the shores of European seas. Its length is about two feet; the bill black; legs dirty flesh-colour. This is by some esteemed the female of the foregoing (*marinus*), and by others as either a variety rather than a distinct bird, or as the younger bird. The bird described by Brunnich under the name of *larus argentatus*, the silvery gull of Latham, is likewise considered as a variety of *L. marinus*.

**FUSCUS.** White; back brown. Linn. Fn. Succ. *La-*

*gris-brun*, Briss. *Larus cinereus maximus*, Marsd. *Göland à mantau gris-brun*, Buff. *Herring gull*, Will. *Donov. Brit. Birds*, &c.

Inhabits Europe, America, and Asia. The length twenty-three inches; bill and legs in the adult bright yellow; eyes straw colour. The birds feed on the herring, the shoals of which it purveys, and thus directs the fishermen to the capture of that fish. The eggs, three in number, are whitish, spotted with black.

**GLAUCUS.** White; back and wings hoary; quill-feathers tipped with white; bill yellow, at the angle saffron. *Ced. Larus albus*, Olaf. *Goeland cendré*, Buff. *Burgermeister*, Martens. *Glaucous gull*, Arct. Zool.

Inhabits Sweden; is larger than the herring gull, very voracious, and feeds on smaller birds, fish, and carrion.

**ATRICILLA.** Whitish; head blackish; bill red; legs black. *Ced. Gavia radibunda*, Briss. *Larus albus*, Scop. *Larus minor*, Sc. Klein. *Baltner's great ash-coloured sea-mew*, Will.

Length eighteen inches. Flies in flocks, with a continual clamour; builds in pine trees, and inhabits America and Europe.

**ATRICILOIDES.** Reddish-white; head, orbits, and neck black; back and wings cinereous; legs scarlet. Falck. *Gmel. Siberian gull*.

Smaller than the former. This inhabits the salt marshes of Siberia.

**\*\* Nostrils covered with a Cere.**

**PARASITICUS.** Two middle tail-feathers very long. Linn. *Sterna*, Sc. It. Wgoth. *Catarracta parasitica*, Brünn. *Stercorarius*, et *stercorarius longicaudatus*, Briss. *Avia Norwegica kyniffa*, Ol. *Lalbe à longue queue*, Buff. *Arctic bird*, Edwards. *Arctic gull*, *Donov. Brit. Birds*, &c.

Length twenty-one inches; the bill and legs dusky; body above dusky, beneath, with the temples, and front white; breast with a dusky band; female brown beneath. Very rare in Britain. The species is found in the north of Europe, and also in Asia and America. It is of a rapacious disposition, and will pursue the lesser gulls in the air till they mute, when, instantaneously darting down, it dexterously catches the excrement before it reaches the water, and devours it. The eggs are cinereous, spotted with black.

**CREPIDATUS.** Dusky-white and brown, varied; two middle tail-feathers longer; anterior half of the feet black. *Donov. Br. Birds. Larus crepidatus*, Gmel. *Hawkesw. Catarracta cephus*, Brünn. *Stercorarius striatus*, Briss. *Black-toed gull*, Arct. Zool. &c.

This, like the former, is very scarce in Britain; its length is sixteen inches; the bill black, with the tip orange; breast and belly whitish, with numerous darkish lines. The two middle tail-feathers longer than the rest; and the anterior half of the feet black; the posterior, with the legs, paler and yellowish, or, as it sometimes appears, bluish.

The description of the black-toed gull in Dr. Latham's Synopsis, is an extract from Pennant's British Zoology, besides which Dr. Latham mentions another bird of the same kind in the late Leverian museum, which had the lighter half of the feet, with the legs, yellow instead of blue. In the description of this latter bird Dr. Latham observes, however, that "the two middle tail-feathers are not particularly longer than the others;" and again in Ind. Orn., this author hesitates apparently from this circumstance, in addition to the yellow colour of the legs, whether it should be admitted as a variety of *larus crepidatus*, or be esteemed a distinct species. It becomes therefore desirable to add that the description afforded us by Dr. Latham is not, in this

respect, entirely free from error; that able ornithologist was, in some manner, deceived, perhaps from the situation of the bird itself, which might preclude the possibility of an attentive inspection. Be this as it may, the Leverian specimen recorded by Dr. Latham, and also another from the same collection, are both in the museum of the writer of this article; in one of these (which we conceive to be the male) the two middle tail-feathers are nearly as conspicuously longer than the rest, as in the Arctic gull projecting beyond them scarcely less than two inches; and in the other, which we apprehend must be the female, they are advanced above an inch beyond the rest; in other particulars they accord pretty generally with Dr. Latham's description, and, as that writer observes, the lighter parts of the feet, with the legs, are yellow. We have besides this another example of this bird, a specimen recorded as being found near Oxford, in which the legs are black and yellow, as in the former, from whence we may conclude those to be the true colours, except perhaps in certain varieties.

**CATARRACTES.** Greyish; quill and tail-feathers white at the base; tail sub-queal. Gmel. *Catarracta skua*, Brünn. *Larus fuscus*, Briss. *Catarractes*, Gelin. *Ska boyeri*, Claf. *Goeland-brun*, Buff. *Cornish gannet*, Ray. *Brown gull*, Albin. *Skua gull*, *Donov. Brit. Birds*, &c.

Length two feet; the bill dusky, and much hooked; upper mandible covered half way down with a black cere; body brown; beneath rufous-cinereous; legs blackish, rough, and warty; claws hooked and black; posterior toe short, and armed with a sharp hooked claw. This voracious bird inhabits Europe, Asia, and America, and is remarkable for its voracity and ferocious disposition, especially in the breeding season. It feeds on fish, and all the smaller kinds of water-birds, and is the terror of the lesser birds of its own tribe, which it haunts on the wing, till they mute or vomit up what they have eaten, and then devours it.

**KEEASK.** Brown; wing-coverts variegated with white; tail black, spotted and tipped with white. Lath. Ind. Orn. *Esquimaux gull*, Arct. Zool. &c.

Inhabits America, as far as Hudson's bay; the length is twenty-two inches; the bill and legs black; toes and membrane half black, half white. It arrives at America in April, constructs a slight nest of grass, and lays two pale ferruginous eggs spotted with black.

**LARYNGEAL**, in *Anatomy*, an epithet applied to parts belonging to the larynx. The laryngeal arteries are the vessels more commonly described under the name of thyroid arteries. The laryngeal nerves, superior and inferior, are branches of the par vagum. See NERVE.

**LARYNGOTOMY**, (from *λαρυγξ*, the upper part of the windpipe, and *τομή*, to cut,) an operation in Surgery, which consists in making an artificial opening into the larynx with a knife, a measure sometimes necessary in certain cases of disease to prevent suffocation, as well as to enable the practitioner to inflate the lungs in instances of suspended animation. The incision is now generally made in the windpipe itself, and the operation called tracheotomy. See TRACHEOTOMY.

**LARYNX**, in *Anatomy*, a hollow organ, placed between the root of the tongue and the trachea, giving passage to the air into and out of the lungs in respiration, and producing the voice.

The organs of locomotion, whether those of the limbs or of the trunk, are the principal means by which man reacts on those external objects which have acted on him through the medium of the senses. They are particularly destined, in the natural state, to provide for the wants of digestion, of which they collect the materials. They also furnish the animal with the

## LARYNX.

the means of offence and defence, of which digestion is in general the immediate object. But social man has vastly extended the domain of this function. Submitted, through the cerebral nerves, to the direction of intellect, it is the instrument by which most of the conceptions of the latter are executed: and if the vast field of activity opened to our view in the arts shews the extensive agency of this power, it proves no less clearly how greatly the sphere of action of the locomotive organs has been increased. Man in society not only derives from his voluntary muscles, by acquiring extreme precision in their motions, much greater advantages than those to which the limited operation of instinct confines animals, but he has also given to them another direction—they serve him as a silent language, and a mode of intellectual communication. The head, the arms, the eyes indicate to us what the voice does not disclose; but gestures are in general only supplementary to the latter function.

Speech is the chief means of our intellectual communications: and here we have occasion to observe how vastly the functions of the larynx are extended by man in society. This extension is still greater than that which the locomotive agents offer to our view in the arts where industry has been pushed the farthest. Originally nature bestowed on man merely a voice, the chief object of which was, to establish those relations which bring together the sexes. Hence the close connection between the voice and the generative organs: it has, like them, a true period of puberty, whether in animals in whom it does not exist at all until that epocha, or in those, where, existing antecedently, it undergoes at this time a remarkable change. Remove these organs, and a new and peculiar modification of the voice soon shews itself. Each sex has a voice distinguished by particular characters: energy and force belong to that of the male; flexibility, delicacy, and grace to that of the female. Most animals employ their voice chiefly at the rutting season; many are dumb at all other times. We cannot therefore avoid the conclusion, that, in the natural state, the communications of the two sexes relating to generation are the particular object of the production of sound. Man in society has destroyed this original destination, and at the same time created another, of which the extent is bounded only by the limits of his intelligence. The mere voice, which sufficiently enables the individuals of both sexes to express the mutual wants connected with the generative functions, is inadequate to the conveyance of those which have arisen out of the state of society. It has therefore been modified; speech is the result of that modification; and thenceforth the larynx has performed a part in society not less important than that of the locomotive organs. These two modes of communication, which man enjoys, are almost equally employed, and produce, each in its way, nearly equal effects. If one be the organic instrument of all the arts, and of all the affections which the mind experiences in the social state through the eyes, the other is the agent of all that belongs to the domain of intelligence, of all that the mind perceives through the ears. Compare the vast stock of ideas, which are transmitted from man to man, with the material objects employed in their reciprocal commerce, and you will find the amount of each nearly the same. Yet, although the sum of the locomotive agents forms more than half of the entire volume of the body, the vocal instrument takes up a little room in a small part of the same body. The great disproportion between the organs of the voice and the important effects which they produce in society, is very striking.

The voice, from its destination, would naturally fall under the immediate empire of the brain. Hence the struc-

ture of the larynx has much analogy to that of the locomotive apparatus. It is composed of cartilaginous pieces, moved in various directions by voluntary muscles, on the motions of which the habits of society have conferred a precision foreign to the natural state, as it has on those of the fingers in certain arts, and on those of the lower limbs in others. Thus the voice is to speech, in relation to the muscles of the larynx, what the rude movements of the fingers of the savage are to the precise and delicate motions of the man who has employed himself on a mechanical art, in relation to the muscles of the upper extremity. The principle is the same, the results only are different. It is a general law in the organs of voluntary motion, that they acquire perfection by exercise, that they are in short susceptible of education.

This dependence of the functions of the larynx on the brain is not only marked in the state of health, but also in diseases. Paralysis, convulsions, and spasms of the muscles of this cavity have the same characters as in the locomotive organs, and have no analogy to the affections of involuntary parts. Hence Bichat has followed the indications of nature, in separating the vocal organs from the lungs in his physiological and anatomical arrangement: their proximity has generally led to their being considered together, in treatises of anatomy and physiology.

The following arrangement will be adopted, in considering the vocal organs: 1st, General considerations on the larynx; 2dly, Particular description of the component parts; 3dly, The assemblage of these parts in the general conformation of the cavity; 4thly, Mechanism of the larynx; 5thly, Its development in various ages; 6thly, The organs of speech; 7thly, The physiology of the voice and speech.

*General Considerations.*—The larynx is a cavity composed of moveable pieces, of a form not easily defined, and occupying the anterior and superior region of the neck. It is situated on the median line, and consequently regular and symmetrical in its form, like all the organs of the animal life. It terminates the trachea above, and forms a striking contrast with the lower extremity of that organ, which, formed by the bronchi, and concerned merely with the functions of the organic life, is made up of two lateral portions not resembling each other. The lateral portions of the larynx are, on the contrary, exactly similar. This symmetry of the larynx is necessary to the harmony of its functions: a discordant voice would inevitably result from different organizations of the two sides, or from inequality in the powers of the muscles of the right and left sides. The organ is placed below the os hyoides, to which it is fixed: it is superficial in front, and rests behind on the vertebral column, from which the pharynx alone separates it.

Designed, on the one hand, to allow a continual passage to the air in respiration, which is to a certain point involuntary; and concerned, on the other, in producing the voice entirely under the influence of the will, the larynx offers to our view a structure accommodated to these two very different phenomena. Several cartilages united together form its cavity, and their elasticity prevents it from being ever closed: hence a free passage is secured for the air. To these moveable cartilages are attached muscles, of which the voluntary contraction may increase or diminish the dimensions of the cavity; circumstances which are essential to the production of the voice. One of these cartilages, very different in its structure from the others, can close the cavity momentarily, by being depressed on its aperture. Lastly, a mucous membrane, continuous with that which lines the mouth, lines all these parts, and is prolonged into the lungs, following all the ramifications of the bronchi.

## L A R Y N X.

The size of the larynx does not follow the proportions of the general stature: it may be as large in a little person as in one of considerable height; and this corresponds to what we know of the voice, the force or weakness of which do not depend on the size of the individual. It would be an interesting research to compare the different kinds of voice with the organization of the larynx. We cannot doubt that the tenor, counter-tenor, &c. are produced by some peculiarities in the laryngeal structure; but the impossibility of knowing, in the case of subjects employed for dissection, what kind of voice the individuals possessed, prevents us from ascertaining any thing concerning this point. The difference in the voices of man and woman cannot but have been always observed; and their larynxes exhibit, on a merely superficial inspection, a great disproportion in size. The organ is large and broad in man: it appears contracted in woman, so as to be about one-third less: often it is not more than half as large as that of the male. This does not depend on stature: a large woman and a short man have this distinguishing character, as well as two individuals of equal size, or as a tall man and short woman. The same circumstance runs through all parts of the larynx: it is observed also in the neighbouring organs, as the trachea, the os hyoides, and their dependencies; and it takes place also constantly.

The general form of the organ is nearly the same, or at least the differences are much less remarkable than those which affect the size. However, the sexes are distinguished in several points. The two plates of the thyroid cartilage are much more oblique and proportionally less separated in man than in woman: hence they form in the former, where they are united in front, a much more considerable prominence under the integuments, and a much more acute angle. This projection is named *promontorium Adami*: in women the angle is very obtuse. The excavation which terminates it above is superficial and rounded in the female; much deeper and terminated by an acute angle in the male. The cricoid cartilage shews no difference in the two sexes in front. The male and female larynxes are distinguished almost solely by their size behind; yet, as the two sides of the thyroid are more widely separated in women, there is in them a greater relative breadth in the triangular spaces which separate this cartilage from the proper cavity of the larynx. The organ is surmounted in man by a much broader and thicker os hyoides than in woman. The epiglottis is also broader, more prominent above, and thicker: its general form is the same in both sexes. The glottis is also of the same form in both, and distinguished merely by its dimensions. As the arytenoid cartilages are longer, and consequently more elevated in man, the ventricles of the larynx are more deeply seated, and more distant from the external opening. The only difference observed below is the greater circumference of the cricoid in man. The trachea corresponds in size to the larynx, and is consequently smaller in women than in men. From the preceding observations it appears that the form of the larynx, although differing slightly in the two sexes, as well as the texture, which is the same in both, cannot be the essential cause of the differences in the key or pipe of the voice, which appear much rather to depend on the striking disproportion in size. It will be seen afterwards, that the particular character of the voice in the infant depends on the same cause.

*Description of the Parts of the Larynx.*—We may distinguish, in this organ, the cartilages which essentially compose its cavity, and give it solidity; 2. The ligaments which tie these together; 3. The muscles moving the cartilages, and thereby constituting the active instruments of the voice;

4. The glandular bodies situated in the neighbourhood of the cavity; 5. The membranous lining. The first four divisions must be examined in detail; the common membrane will be described with the larynx taken altogether.

*Cartilages of the Larynx.*—These are five in number. The first, named the thyroid, is broad and tolerably thick; it covers the organ in front, but is no farther concerned in forming the cavity than by the attachment it affords to certain ligaments and muscles. The second or cricoid cartilage, which possesses, as its name implies, an annular figure, forms the solid part of the cavity. Two arytenoid cartilages, situated behind, and much smaller than the others, give to the glottis that mobility which makes it the seat of the voice. Lastly, the epiglottis, a true fibro-cartilage, has the office of closing the larynx occasionally.

The thyroid or scutiform cartilage occupies the front and lateral part of the larynx, measuring more from side to side than from above downwards, and being broader above than below. It consists of two lateral portions obliquely united in front, where they form a more or less prominent acute angle, corresponding to the median line, and producing a conspicuous prominence in the neck of the male, already mentioned by the name of *promontorium Adami*. This angular prominence is bifurcated above, simple and rounded below. Each of the lateral divisions offers in front a nearly plane surface, slightly concave, covered principally by the thyro-hyoideus muscle. An oblique line bounds this surface externally, and affords attachment to the thyro-hyoideus, sterno-hyoideus, and the inferior constrictor of the pharynx. Behind it is a small surface covered by the two latter muscles. This cartilage presents behind a concavity in the median line, corresponding to the front prominence: the ligaments of the glottis and the thyro-arytenoid muscles are attached to this. Two plane surfaces, sloping backwards, correspond above to these muscles, from which a fatty cellular substance separates them, and below to the lateral crico-arytenoid muscles, and to some fibres of the crico-thyroidei.

Four edges terminate the surfaces of the thyroid cartilage. The superior is the largest, affords attachment throughout to the thyro-hyoideal membrane, has in its middle the notch surmounting the angle of union of the two pieces, then proceeds onwards on each side nearly horizontally, presenting a slight prominence corresponding to the external oblique line, and terminates beyond this by an appendix which will be mentioned. The inferior edge is shorter, concave in the middle, and has on the sides two convex prominences corresponding to the lower ends of the external oblique lines, and then two depressions. It affords attachment to the crico-thyroid membrane and to the crico-thyroidei muscles. The posterior margins, two in number, are directed obliquely, and rest against the spine: rather concave above and convex below, they afford attachment to some fibres of the stylo and palato-pharyngei. A rounded process, of different lengths in different subjects, directed obliquely backwards, surmounts each of these margins, and is connected by a ligament to the extremity of the os hyoides: these are the superior cornua of the thyroid cartilage. A similar rounded process, shorter than the former, directed rather forwards, terminates each of the perpendicular margins below: these are the inferior cornua, and are articulated by their extremities to the sides of the cricoid cartilage.

A round opening is sometimes seen on each side of the cartilage, towards its upper part, transmitting an artery and nerve to the cavity of the larynx.

The cricoid or annular cartilage occupies the lower and



branous connections: we shall consider at present only those of the first kind, the others belong to the general description of the organ.

The thyroid is connected to the cricoid cartilage in front and on the sides. In the former situation, a membrane, called the crico-thyroid, proceeds from the upper edge of the cricoid cartilage, and is attached to the middle of the lower border of the thyroid; it is lost insensibly on each side on the mucous membrane of the larynx. It is deepest in front, and grows narrow and less distinct towards the sides; it has a fibrous appearance in the former, which it loses in the latter of these situations. Covered on the sides by the crico-thyroidei muscles, it is subcutaneous in front, and corresponds to the laryngeal membrane behind. It allows a considerable motion between the two cartilages. On the sides there are two small articulations, formed between the inferior cornua of the thyroid, and the lateral articular faces of the cricoid: they are lined by loose fibrous membranes, and lubricated by a tolerably copious synovial secretion. The surfaces, which admit readily of a gliding motion on each other, are held together by very distinct ligamentous fibres. An anterior fasciculus is continued obliquely downwards and forwards from the front of the thyroid cornua to the side of the cricoid cartilage. A posterior goes from the back of the same process, and ascends to be fixed to the back of the cricoid under the arytenoid cartilage. There are some irregular fasciculi, besides the two first described.

The opposed surfaces of the arytenoid and cricoid cartilages are covered by very loose synovial membranes, lubricated by a copious secretion, and strengthened by ligamentous fibres at some parts. The most remarkable of these fibres are on the inside and behind; externally they are little apparent, and seem often hardly to exist at all.

Each of the arytenoid cartilages is connected to the thyroid by a fibrous fasciculus, particularly important on account of its concern in the production of the voice. They are called the aryteno-thyroid ligaments, ligamenta glottidis, or chordæ vocales. The ligament composed of parallel fibres, and about half an inch in length, arises from the anterior prominence of the basis of the arytenoid cartilage, passes horizontally forwards and inwards, and is fixed to the concavity of the angle formed by the junction of the two sides of the thyroid, uniting at this point with that of the opposite side. It is covered externally by the thyro-arytenoid muscle, and corresponds every where else to the mucous membrane. The slit-like aperture left between the right and left ligaments is the glottis, or rima glottidis.

The two arytenoid cartilages are connected together merely by the membrane of the larynx, and by the arytenoid muscle. It is said that a transverse fibrous fasciculus is sometimes placed in front of the latter, to prevent the two cartilages from being separated too widely.

The acute and elongated angle, which terminates the epiglottis below, gives origin to a narrow fibrous fasciculus, about half an inch in length, which is covered in front by the epiglottic gland, and is fixed to the angle of the thyroid, just above the attachment of the ligamenta-glottidis.

The arytenoid cartilages are not connected to the epiglottis by any fibrous union; two considerable membranous folds, forming the principal part of the upper aperture of the larynx, proceed from the former to the sides of the latter; they seem to be the ligamenta thyroidea superiora of Soemmerring.

*Muscles of the Larynx.*—The organ is moved by two kinds of muscles, of which one is common to it with other parts, the other belongs particularly to it. The first are the mus-

cles of the os hyoides, and move the whole organ together; these, as well as the os hyoides, are described in the article DEGLUTITION. The others are concerned in moving on each other the parts of the larynx.

The *crico-thyroideus* is a thin quadrilateral muscle, situated in front of the larynx, and often divided into two parts by a fatty line. It is attached to the front and sides of the cricoid, and proceeds upwards and outwards to the inferior edge of the thyroid, to which, as well as to a little of the posterior surface, the internal fibres are fixed. The external are longer, and reach to the front of the inferior thyroid cornua. An interval appears between the right and left muscles, in which the crico-thyroid membrane is visible. It corresponds in front to the sternum thyroideum, and to the inferior constrictor of the pharynx; behind to the crico-thyroid membrane, and to the crico-arytenoideus lateralis.

The *crico-arytenoideus posterior* is a strong muscle, flattened on its surface, triangular, and placed at the back of the larynx. Its origin fills the lateral excavation of the posterior surface of the cricoid. The superior fibres are the shortest, and proceed nearly transversely; the following are longer, and gradually more and more oblique from below upwards and outwards; they are attached to the posterior and outer part of the basis of the arytenoid, between the insertions of the arytenoideus, and of the crico-arytenoideus lateralis. In front it corresponds to the cricoid cartilage, and behind to the membrane of the pharynx.

The *crico-arytenoideus lateralis* is a thin and flattened muscle, rather elongated and quadrilateral, proceeding from the side of the cricoid to the side of the arytenoid cartilage. It arises from the superior margin of the former, passes obliquely backwards and upwards, and is fixed externally to the basis of the arytenoid. It is connected in front with the thyro-arytenoideus, separated on the outside from the thyroid cartilage by cellular substance, and lined on the inside by the laryngeal membrane.

The *thyro-arytenoideus* is a thin and flattened muscle of irregular figure, situated within the concavity of the thyroid cartilage. It arises near the angle of that cartilage, from the lower part of its posterior surface, proceeds backwards and outwards, becoming rather narrower, and is inserted in the front of the arytenoid cartilage, below the preceding, to which it is closely connected. It corresponds externally to the thyroid cartilage, and internally to the laryngeal membrane.

The *arytenoideus* is the mass of muscular fibres filling the posterior concavities of the arytenoid cartilages, and occupying the interval between them. The fibres arise from the concave surface of one cartilage, go across, and are inserted into the corresponding part of the opposite cartilage. They are partly oblique and partly transverse; the former consist of a few superficial fibres crossing respectively from the basis of one to the apex of the other cartilage, and consequently decussating like the two parts of the letter X. The great mass of the fibres has however a transverse direction. From the different courses of these two descriptions of fibres, two arytenoid muscles have been distinguished; viz. an obliquus and a transversus. These fibres are placed between the membranes of the larynx and pharynx; in front they are also partly in contact with the arytenoid cartilages.

Under the names of *thyreo-epiglotticus, major* and *minor*, some anatomists have described a few slender fibres proceeding from the posterior surface of the thyroid cartilage to the side of the epiglottis. Others do not admit the existence of these muscles, which are allowed by all not to be found generally. Haller regards these fibres, when they

exit, as a part of the thyro-arytenoideus. The motions of the epiglottis, in the human subject, are all entirely of a mechanical nature, and not performed by muscular action.

*Glands of the Larynx.*—There are three bodies of this description in the neighbourhood of the organ; viz. the epiglottic, the arytenoid, and the thyroid.

*Glands of the Epiglottis.*—In front of, and below the epiglottis, a triangular space is left, bounded behind by this cartilage, in front by the thyro-hyoidean membrane, below by the thyro-epiglottic ligament, and on the sides by the lateral folds of mucous membrane which line the two spaces left between the sides of the thyroid and the cricoid cartilage. This space is filled by a body, manifestly cellular and adipous for the most part, but covering below small granular glands, sometimes united together, sometimes insulated, and sending prolongations into the holes with which the epiglottis is pierced. The latter open on the laryngeal surface of the organ by very distinct apertures. The glandular bodies are sometimes so much covered and concealed by the surrounding fat, that they can hardly be distinguished. In all cases we may remove by dissection these bodies from the openings in the epiglottis, which then appear as empty spaces. We may distinguish as many as thirty of these. The superior excavations of the epiglottis contain small distinct grains: the epiglottic gland and its cellular tissue belong only to the inferior half of the organ. The openings in the epiglottis are of different sizes; they are very regularly formed, with rounded edges, and penetrate always straight through, never obliquely.

*Arytenoid Glands.*—In the fold of mucous membrane, proceeding on each side from the epiglottis to the arytenoid cartilage, a small body is found, evidently of a glandular nature, presenting small distinct grains, very analogous to those which compose the lacrymal gland, and generally of a greyish hue. It may be compared in form to a carpenter's square. The perpendicular branch, which is rounded, and may be felt by the finger, when we seize the fold that contains it, lies against the front of the arytenoid cartilage, and is loose above. The horizontal branch runs along the superior fold of the ventricle of the larynx, and is less prominent than the other. The situation, at which the two branches form their angular union, is in front of the base of the arytenoid. The glandular grains of this small body, probably, have excretory ducts terminating on the edge of the superior aperture of the larynx: but these apertures are not visible like those of the ducts of the last-mentioned glands.

These epiglottic and arytenoid glands furnish a mucous secretion, and are of the same nature as the others which belong to the laryngeal membrane. The passage of the food in deglutition, and of the air in respiration, requires that these organs should be defended by a mucous fluid.

The *thyroid gland* is one of those organs, of which the use is entirely unknown to us, although its constant existence, through all periods of life, and the great number of vessels which it receives, do not allow us to doubt that it performs some important office. Its situation immediately below and in front of the larynx, leads us to connect its history with that of this cavity, although we are ignorant whether it has any concern in the same functions. This organ, as well as the spleen, capsula renales, &c. suggests a very important reflection; viz. that our notions concerning the general relations of the functions of the animal economy must still be necessarily very imperfect, and that we should deceive ourselves if we suppose that we can embrace the plan of nature in one general view, and represent it accurately in our physiological classifications. Can we

doubt that the unknown functions of these viscera are connected to the general plan, and make an essential part of it? How then can we be certain that a knowledge of them would not either partly overturn, or considerably modify our present notions on those subjects. Why is the theory of foetal existence still so obscure? Because the functions of several organs, at that time perfectly developed, and in a very active state, escape our observation, and we cannot arrive at general results when the particular facts are unknown.

The bulk of this gland, which is always very considerable, varies much in different individuals: perhaps no organ presents more striking variations. No particular condition of the body, no modification of any particular function, no differences in stature, in the state of the larynx, trachea, lungs, &c. have been observed to accompany these varieties. Its form is tolerably constant; but in this respect there are also varieties. It is composed of two distinct portions, nearly pyramidal in their figure, occupying the sides of the larynx, and of the upper extremity of the trachea, so that the base is placed downwards and forwards, and the apex stretches upwards and backwards. Variations are observed in the extent and direction of these two lateral portions. They are united in front by a small flattened transverse band, which may be large and thick, small and narrow, or made up of distinct tubercles; indeed, we scarcely find it the same in two individuals successively. In a few instances this part does not exist, so that there are two distinct thyroid glands, one on each side. It does not extend above the trachea, so that the whole larynx is uncovered in front, nearly subcutaneous, and embraced by the curve formed by the two lateral portions of the gland united by the intermediate band.

In front the thyroid gland is covered by the sterno-thyroidei, sterno-hyoidei, omo-hyoidei, and latissimi colli. It rests behind and towards the outside on the vertebral column, to which a loose cellular substance connects it, and where, according to its bulk, it conceals or leaves exposed the nerves and blood-vessels of the neck. Internally, or towards the middle line, it covers the sides of the first rings of the trachea, part of the cricoid and thyroid cartilages, the crico-thyroidei, thyro-hyoidei, and inferior constrictor of the pharynx. Exactly in the middle and front it conceals the two first rings only of the trachea. A loose tissue separates it from all these parts.

It is surrounded by no membrane: the exterior cellular tissue is rather more dense and compact than the rest, as in the pancreas and salivary glands; but it forms no proper membrane. It never contains any fat.

With this external covering some muscular fibres are blended; not noticed by Albinus, nor by most other anatomists, but forming the levator gland. thy. of Haller, the musculus gland. thy. of Soemmerring. It does not exist constantly; is generally a single muscle, situated in the middle of the larynx, sometimes is placed towards the right or left, and sometimes, but very rarely, is double. It arises by a narrow tendinous slip from the basis of the os hyoides; descends in a straight course, growing broader, and has its fibres expanded on the front of the gland, and blended with the covering of the organ. It must apparently have the effect of suspending and supporting the gland. Muscular fibres have sometimes been seen, extending over the surface of the gland from the crico-thyroideus. Besides the effect, which these and the fibres just described may produce on the gland, it will be exposed to powerful compression against the larynx and trachea by the sterno-hyoidei and sterno-thyroidei, which embrace it very closely.

The proper tissue of the thyroid gland varies considerably

in colour and density : it is often red, and even dull brown, like the spleen, sometimes yellowish or greyish. It may be flabby or compact ; but its density varies less than its colour. The substance of the organ, like that of other glands, is disposed in distinct lobules, which are collected into more or less voluminous lobes. This conglomeration is never so perceptible as in the salivary glands, the pancreas, &c. ; excepting, however, certain cases of increased volume without organic change, where the surface of the organ is tuberculated and irregular from the unequal prominence of the lobes. In the natural state of the part, we may distinguish the lobes by dissection, as the great vascular trunks run in their intervals ; the latter, which are hardly perceptible at first view in consequence of the lobes being pressed against each other, become apparent by the use of the knife. A fine cellular tissue, never containing any fat, and small in quantity when compared to what is found between the lobes of other glands, is seen in these intervals.

The lobes of the thyroid gland are mixed in some subjects with rounded vesicles, containing sometimes a yellowish, sometimes a transparent and colourless fluid. In most subjects these cysts do not exist, and in many we cannot observe the slightest traces of them. Yet slices of the gland recently cut give us a peculiar feeling of viscosity, not observed in other glandular bodies, and proceeding from the fluid just mentioned. If an acid be poured on the cut surface, a slight white effluvia is produced, as in most other organs.

Although provided with a great number of blood-vessels, the thyroid gland contains in its capillary system less blood than the liver, the kidney, &c. It only discolours the water of maceration once or twice, which arises evidently from the small number of its capillaries. It is not by the large vessels, in which the blood is influenced by the heart's action, but by the capillaries, that we may judge of the quantity of blood habitually contained in an organ. As putrefaction generally proceeds more quickly, in proportion as the quantity of blood remaining in the organs after death is greater, the thyroid gland undergoes this change less readily than most others. Slices of it dried are greyish and friable. When boiled, they curl a little before ebullition, and then become considerably harder and corrugated as almost all the animal solids do. But, instead of growing soft again, like the muscles, tendons, &c. they are rendered still harder, like the glands, by a continuance of the boiling. Acids and alkalies have no peculiar operation on the tissue of the thyroid gland.

Nothing like an excretory duct has hitherto been discovered in this body : no communication has been pointed out between it and the trachea or larynx. The emphysema, of which it is sometimes the seat, proves nothing in this question ; for the air is contained in the cellular tissue which unites the glandular lobes, and is introduced in consequence of its general diffusion in the cellular tissue of the neck. By inserting a blow-pipe into the substance of the organ, and inflating forcibly, it may generally be distended so as to form an artificial emphysema. The air, in this case, is not contained in the vesicles, but in the cellular interstices : it follows the course of the vascular trunks.

Some sexual differences may be noticed in the thyroid gland. It is generally larger in the female, and its lateral divisions are more prominent in front ; which diminishes the apparent prominence of the thyroid cartilage. In man, on the contrary, the two lateral portions are thinner and proportionally flatter ; and lie more close on the sides of the larynx, below the external oblique line of the thyroid cartilage. But there are so many varieties in other points, that this sexual difference is often little observable.

The differences from age are few. The gland is proportionally larger in the fœtus and child than in the adult. Its front prominence is more striking at the first period : and its colour is deeper and brownish. Its proportional excess of volume cannot, however, be compared to that of the thymus, capsule renales, &c. : indeed, it is not sufficiently remarkable to authorize us in concluding that the use of the part is particularly relative to fœtal existence, although several authors seem to have believed this.

The thyroid gland has four large arteries, two on each side, one of which is derived from the external carotid, the other from the subclavian trunk. No part in the body has so considerable an arterial supply as this organ ; that of the brain is very much less in proportion. The inferior thyroid artery in the child is as large as the remaining trunk of the subclavian after its origin. These vessels are connected in the gland by large and numerous anastomoses. The veins correspond in number and magnitude to the arteries, and terminate in the jugular and subclavians. The absorbing vessels are also considerable, and join the jugular glands. The thyroid arteries are accompanied by nervous filaments from the great sympathetic ; but it cannot be easily decided whether the proper substance of the gland receives any nervous supply.

As we have stated already that the use of this organ is unknown, we shall not fatigue the reader with mentioning and refusing the assigned offices. Although they are very numerous, they are not grounded on any facts worthy of attention. Soemmerring, in his 6th vol. *De corporis humani fabrica*, § 56, gives a long list of "opiniones de glandulæ thyroideæ usu," and there is a similar catalogue in Haller's *Elementa*, lib. ix. sect. 1. § 22

#### *Of the Larynx in general.*

*General Conformation.*—The larynx is a cartilaginous cavity moved by various muscles. It is broad above, narrower below, and possesses an external figure, which does not correspond to that of the internal hollow. In fact, the latter, being essentially formed by the cricoid and arytenoid cartilages, and the membranous coverings belonging to them, possesses nearly a uniform diameter throughout ; and it is most contracted towards the upper part. This arises from what we have said of the thyroid cartilage, which rather protects than forms the larynx, although it is essential to its structure and action, from the attachment which it affords to muscles and ligaments. We may consider, in our view of this organ, the external and internal surfaces, the superior and inferior extremities.

The external surface, considered in front, presents, on the median line, the prominence formed by the union of the two portions of the thyroid, which exhibits, above, a considerable depression, particularly in man ; then the membranous interval, which separates the two crico-thyroides, and below it the convexity of the cricoid : on the sides we see the two flat surfaces of the thyroid cartilage, covered by the hyothyroides, the external oblique line, the triangular surface covered by the inferior constrictor, and terminated by the inferior cornu, lower down the crico-thyroides, which, at this point, almost entirely covers the cricoid cartilage. Behind, the external surface of the larynx, more depressed in the middle than towards the sides, presents, on the median line, the middle prominence of the cricoid : on the sides of this, the hollows lodging the crico-arytenoidæ postici, then a triangular space, broad above and narrow below, filled with a more or less adipous cellular substance ; lastly, two rounded edges, bounding the spaces just mentioned, more prominent than any other parts in this aspect, and resting on the vertebral column, so as to allow a free motion

to all the essential parts of the organ, particularly to the arytenoid cartilages.

The internal surface of the larynx, lined throughout by the mucous membrane, may be divided into two parts, one solid, the other moveable. The first is inferior, in point of situation, and formed entirely by the cricoid ring. The proportions of this part are constantly the same; and it contains nothing worthy of notice. The moveable portion is above, formed behind by the arytenoid cartilages, in front by the thyroid and epiglottis, on the sides by the folds of mucous membrane, continued between the epiglottis and the arytenoid cartilages. In the ordinary state this is triangular, broad in front, and narrow behind; but the motions of the epiglottis and arytenoid cartilages change its figure considerably. This part forms the opening by which the larynx communicates with the pharynx: the aperture is placed just behind and below the root of the tongue, and is often called the glottis, although it has no share in the formation of the voice. Of its relation to the pharynx, in respect to deglutition, see a further account in that article. The part, at which these two divisions of the larynx are united, is remarkable for the two membranous folds, called ligamenta glottidis, or chordæ vocales. These arise from the bases of the arytenoid cartilages, and pass obliquely, forwards and inwards, to meet together at the concavity of the thyroid, where they are fixed just under the epiglottis. They leave between them a triangular space, of which the basis is behind, and the apex forwards: this is the true glottis, and is placed about half or three quarters of an inch lower down than the opening described above: as the measurement of the opening from behind forwards considerably exceeds the transverse diameter, it has a slit-like appearance, from which the name of *rima glottidis* has been applied to it. The folds, which form the sides of the upper opening, differ essentially in their composition from those of the inferior aperture. The former are merely membranous: the latter contain the fibrous fasciculi, described already under the name of the thyro-arytenoid ligaments. The interval left on each side between the superior and inferior folds constitutes the ventricles of the larynx, or *fasciculi laryngis*. Their form must correspond to the direction of the folds, which have been just described; their depth is inconsiderable. Sometimes the mucous secretion of the internal lining accumulates here for a short time: sometimes foreign bodies become engaged in them, and produce suffocation by stopping the *rima glottidis*, or cause great distress until they are removed. The ventricles, as well as the superior laryngeal folds, correspond on the outside to the thyro-arytenoid muscles: the inferior folds separate these muscles from the crico-thyroides, which complete towards the outside the space separating these folds from the circumference of the cricoid.

The inferior extremity of the larynx, formed by the inferior circumference of the cricoid cartilage, is exactly circular. It is united to the first ring of the trachea by a fibrous membrane, similar to those which unite to each other the remaining rings of this tube. Behind, the posterior tracheal membrane is attached to it.

The superior extremity, much larger than the inferior, is formed in front and at the sides by the upper edge of the thyroid cartilage. This edge is connected to the os hyoides, which is immediately above it, by the loose and soft thyro-hyoidæal membrane: this is thicker in front than towards the sides, has very little fibrous appearance, but seems rather of a cellular nature. It is covered by the hyo-thyroides and sterno-hyoides; it corresponds behind to the epiglottis, from which the epiglottic gland separates it, and to the la-

ryngeal membrane. It is shorter in the middle than at the sides; consequently the cornua of the os hyoides can be elevated to a greater distance from the thyroid cartilage than the basis of the same bone, and the basis of the tongue, which is supported by the os hyoides, can be drawn up higher at the sides than along the middle line; which disposition of parts is favourable to the formation of the channel, along which the food is conveyed towards the œsophagus. The two extremities of the os hyoides are connected to the superior cornua of the thyroid cartilage by long, dense, and round ligaments, generally containing granular bodies of a cartilaginous or bony nature. These are named ligamenta hyo-thyroidea lateralia, to distinguish them from the former, which is called lig. hyo-thyroid. medium. The length of these lateral ligaments, in addition to that of the thyroid cornua, measures the distance between the os hyoides and the thyroid cartilage behind, which is about double the front interval.

Behind the edge of the thyroid cartilage, and in front of the epiglottis, there is a triangular space filled by the epiglottic gland, and its adipous cellular substance. This space is bounded above by the fold of mucous membrane continued from the basis of the tongue to the epiglottis, and, moreover, by a kind of fibrous membrane, which lies immediately under the former, and over the gland. The membrane in question is stronger in the middle than at the sides: it arises from the concavity of the os hyoides, and is attached to the middle of the epiglottis. Behind this space we see the epiglottis, and behind it the superior opening of the larynx, already mentioned. As the breadth of the epiglottis, which forms the front of this opening, is always the same, while the arytenoid cartilages, which compose the back part, admit of considerable motion, the figure of the aperture can undergo little change in front, while it may vary much more considerably behind. The position of the opening is rather oblique, from before backwards and downwards.

*Membrane of the Larynx.*—The interior of the cavity is lined by a mucous membrane, forming part of the general system common to the respiratory and digestive organs. It proceeds backwards from the basis of the tongue over the front of the epiglottis, forming, as it passes, the three folds already described: it is reflected over the loose edge of this fibro-cartilage, covers its posterior surface, and then enters the larynx. On each side it is continued directly backwards to the arytenoid cartilages, being loose and unconnected at its edge, and corresponding only to the thyro-arytenoid muscles. At the posterior edge of the opening of the larynx, it is continuous with the membrane of the pharynx. When it has arrived in the cavity of the larynx, and towards the basis of the arytenoid cartilage, it forms on each side a horizontal fold, directed obliquely forwards to the concavity of the thyroid, to which it is fixed, joining that of the opposite side. Below this point it lines the cavity of the ventricle, then forms another fold, which bounds this cavity below, and embraces the thyro-arytenoid ligament: it afterwards lines the lower portion of the larynx, and is continued into the trachea. In the whole of its extent the mucous membrane is of a pale rose-colour, and distinguished by that character from the lining of the mouth, of which it is a prolongation, and which is much redder. Its density is considerable, particularly on the cartilages, where it is united with the perichondrium: in other parts it is more thin and loose in its texture. On the laryngeal surface of the epiglottis, it is perforated by several holes, which are the terminations of excretory ducts. Mucous glands are apparent in several points of its surface. The capillary system of this membrane is not very considerable, and hence arises its paleness.

palaeus. It possesses very acute sensibility from the superior opening to the glottis; but is much less sensible below. For an account of the relation, which this property bears to the functions of the part, see *DEGLUTITION*. The sensibility is not excited by the contact of air, as that is habitual; but it is quickly roused by vapours disseminated in the atmosphere, particularly when they are at all acrid.

*Mechanism of the Larynx.*—The motions of this part are of two kinds, general and particular. The former, in which the whole larynx is moved, take place in deglutition, and in the pronunciation of different sounds. For an account of the former, and of the powers which act at that time, see *DEGLUTITION*.

The larynx is moved in the same way, and by the same muscles, in the pronunciation of different sounds. When an acute sound is uttered, it ascends very sensibly; and this ascent, which is gradual, according to the tone, may be felt by placing the finger on the thyroid cartilage, while we go through the gamut. In the formation of grave sounds, there is, on the contrary, a very sensible depression. These motions can be very clearly seen in the throat of a finger: the rapid and considerable changes which take place in that mode of exerting the voice, render the motions very perceptible. The ascent of the larynx is necessarily accompanied by an elongation, and its descent by a shortening of the trachea; in the former case its diameter is diminished, and in the latter increased. Some have supposed that these changes in the trachea are concerned in producing the alterations of tone; but if they produce any effect on the sounds, it is very slight, and they seem rather to be merely consequent on the movements of the larynx.

What connection is there between the sounds uttered and the general motions of the larynx? We know very little on this subject. We may observe that they have no relation to the force or weakness of the sound; so long as the voice remains at the same tone, the larynx does not move, however the sound may be changed in strength or weakness.

The thyroid and cricoid cartilages admit of reciprocal motion; the former can be brought downwards and forwards upon the latter; in this case the chordæ vocales are relaxed. The crico-thyroideus muscle has this effect.

But the motions of the arytenoid cartilages are the most important, on account of their connection with the chordæ vocales. They may be brought towards each other, until, indeed, they come into actual contact; this is attended with a proportionate approximation of the chordæ vocales. When the cartilages touch each other, the rima glottidis is completely closed; this is done by the arytenoid muscle. This shutting of the aperture is sometimes produced spasmodically, as when the parts are irritated by acrid vapours, or by foreign bodies coming into contact with them. Respiration must experience a temporary obstruction under such circumstances. When these cartilages are moved away from each other, the chordæ vocales are separated, and the rima glottidis proportionally enlarged; this is the action of the crico-arytenoides pollicis. The arytenoid cartilages admit also of being moved forwards and backwards; the chordæ vocales are rendered tense in the former state, and are relaxed in the latter. The thyro-arytenoidei and crico-arytenoidei laterales carry them forwards; and the crico-arytenoidei pollicii backwards.

*Development of the Larynx.*—The differences of this organ, according to the age of the individual, are not less conspicuous than the sexual distinctions in the adult. They refer to two principal periods; viz. the years which precede, and those which follow puberty; for the great changes in the structure of the larynx, which in this respect follows the

development of the sexual organs, take place about this epocha. In the fœtus and child there are no differences in the larynxes of the two sexes: until the period of puberty, the same size, the same rounded form, and the same want of prominence are observed both in the male and female. At this time the organ is much smaller in proportion in both sexes, but more particularly in the male, than it will be in the sequel. This will appear in a more striking point of view, if we compare the larynx to the os hyoides, which surmounts it. That organ, already much advanced, in consequence of its connection with the tongue, which is developed early in life, projects before the larynx; while in the adult, and especially in the male subject, the larynx projects before it. The thyroid cartilage can hardly be said to have a prominent angle in the child. It is rounded at this part in either sex. Nothing particular is to be observed of the cricoid cartilage; and all the parts at the back of the larynx present the same dispositions as in the sequel, excepting the difference in size.

The nature of the voice is influenced by this diminutive size of the larynx, and by the sameness of its conformation in the two sexes. At this period of life we remark that its pipe or key is slender, and that its character is the same in both sexes. If there is any difference, it is not such as that which in the sequel distinguishes the voice of man from that of woman.

As the growth proceeds, the larynx approaches to the state in which we find it in the adult. Yet it does not follow the same course of development as most other organs. In children of six months it is often as large as in those of two years. Sometimes in a subject of three years it will be smaller than in one of a year, although the stature of the two may be suitable to their respective ages.

A change almost sudden, or at least much less gradual than any which had occurred before, in the functions of the larynx, is remarked at the epocha of puberty: this indicates an alteration in the organization of the cavity, and a more rapid development of its structure. The change is much more remarkable in man than in woman, because the larynx remains much smaller in the latter than in the former, even after puberty. At this time the larynx is enlarged in all its dimensions by a speedy growth analogous to what is observed in the generative organs. But while this change is going on, for several months, the voice has a peculiar pipe, which is neither that of infancy nor of adult age.

After puberty the larynx undergoes no well marked change: its form becomes more fixed, and the prominence of its thyroid cartilage more considerable in man.

In the old person, as the cartilages are constantly receiving fresh depositions of earthy matter, they at last nearly equal bone in hardness. This change affects the thyroid first; then the cricoid, and lastly the arytenoids. The epiglottis is hardly ever affected, probably on account of its peculiar organization, which resembles that of the cartilages of the nose, ears, &c. This exemption is very favourable to its functions, which require pliancy. The voice always becomes weak and broken in the aged; the weakness of the muscles and the stiffness of the joints account for this, as analogous changes explain similar phenomena in the organs of locomotion.

The remarkable change in the pipe of the voice produced by the removal of the testicles has been mentioned in the article *GENERATION*. It has not been ascertained whether there is any change in the organization of the larynx in these cases.

The parts hitherto described are the instruments by which the voice is produced: the action of other organs is required,

quired, in order to modify this, so as to form it into articulated sounds or speech. Of these the tongue and the os hyoides are the most important: the latter bone is the basis of the tongue, the fixed point from which its muscles proceed, as also the point of attachment of the chief muscles of the larynx. The description of these organs, and of the muscular powers employed in moving them, will be found in the article *DEGLUTITION*. A knowledge of the parts about the throat, which anatomists generally term the fauces, is also essential in considering the subject of the voice. The larynx opens into a large membranous cavity, descending from the basis of the skull in front of the six upper cervical vertebrae, and named the pharynx. A large opening in the front of this, and between the tongue and soft palate, leads into the mouth: this aperture may be either free or closed. Another passage goes above the palate into the nose; but this is not so changeable in its dimensions as the former. Thus the air, expelled from the larynx, must proceed either through the mouth or the nose, or both. The mouth is the large space bounded by the lips and cheeks, the tongue and palate. Into it the tongue projects below, with free power of motion in every direction, and in the ordinary state nearly fills the cavity. The two rows of teeth form a kind of division into an outer and an inner cavity. For the more particular description of all these parts, see *DEGLUTITION*.

It was formerly held that the palate and uvula had a considerable influence on the voice: but this seems doubtful. The softness of the part, which is drawn down against another soft part, the tongue, renders it unfit for producing any modification in the sound. Animals, for the most part, have no uvula, and we know that the organ may be variously diseased without affecting the speech: "Wherefore," says Haller, (*Elem. Physiol. lib. ix. sect. 2. § 17.*) "if affections of the uvula have produced any considerable alterations in the voice, I should be rather inclined to ascribe them to some undue passage of the sound from the velum palati being at the same time injured. Thus, when the nose is diseased, a peculiar modification of the voice takes place, not because the nostrils are moved in the vocal functions, but because they transmit or reflect the sonorous tremors of the air. Thus, too, when the voice is injured by destruction of the bony palate, an artificial plate, which restores the power of reflection, without adding any motion, remedies the deficiency. I have the same opinion concerning speech. The guttural letters may be less perfectly formed, when the organs about the throat are diseased, because the allusions of parts cannot take place in the natural way: but the uvula is concerned in the pronunciation of no letter, and we might quote numerous authors who have seen it entirely cut away, or destroyed by disease, or originally deficient without the speech being impaired."

The passage from the pharynx, above the velum palati, leads into a large and irregularly formed bony cavity, lined with a soft membrane, and increased by many excavations in the neighbouring bones. This is the cavity of the nose, divided by a nearly perpendicular partition into two halves, the right and left nostrils. This cavity is described under the articles *CRANIUM* and *NOSE*. The air emitted from the larynx, rushes into these bony hollows, when they are not filled with mucus, strikes their sides, and throws the whole of the surfaces into vibrations, from which important modifications of the voice ensue.

*Physiology of the Voice and Speech.*—The voice, like all other sounds, is a vibration communicated to the air; and it offers to our observation, like them, three distinct kinds of qualities, independent of each other. 1. The tone, or the various degrees of acuteness and graveness, which depend on the ve-

locity of the vibrations. 2. The intensity, or the degrees of force, which depend on the extent of the vibrations. 3. The character or key, which arises from circumstances hitherto undetermined, and relating to the structure, the substance, or the figure of the sonorous body. The human voice is susceptible of a fourth order of modifications; viz. that which we represent by the letters of the alphabet, and which is itself divided into two other orders; the one relative to the principal sounds, which we represent by the vowels; and the other to their articulations, which constitute the consonants. We do not exactly know on what the two latter modifications depend: and although we perceive to a certain point the circumstances under which they are executed, we are not yet able to imitate them by artificial instruments.

The sound is produced by the passage of air through the rima glottidis, or the slit-like opening left between the two chordæ vocales. Almost invariably it is the passage of the air from the lungs, in expiration, that produces the sound; but there are some rare exceptions to this. In hiccup, and under some circumstances in coughing, sound is produced during inspiration. Many conceive, moreover, that the phenomena of ventiloquism are to be explained by the exertion of the vocal organs, when air is admitted into the chest.

That the larynx is the primary organ, in which the original sound is produced, is proved by the circumstance, that diseases and accidents affecting it destroy or modify the voice. If an opening be made in the trachea, below the larynx, so that no air shall pass through the latter, no voice is produced. When, on the contrary, an opening is made immediately above the glottis, the voice is not affected. Bichat made an incision between the os hyoides and the thyroid cartilage, and through the membrane, which connects the tongue to the epiglottis: through this transverse opening he drew out the epiglottis with a hook, so that the sound, instead of passing through the mouth and nose, came directly by the external wound. The voice was as strong as before, and very little changed in character. He drew the glottis between the sides of the wound, so that the sound could not pass at all into the mouth and nose: the result was still the same. In these experiments the epiglottis may be completely confined, or even cut away, without affecting the phenomena, so that it can have no concern in the formation of the voice. When the arytenoid cartilages were cut through, or the thyroid divided longitudinally, as in the operation of bronchotomy, the voice was destroyed.

The two elastic ligamentary and membranous bodies, which form the chordæ vocales, are analogous, in the human instrument of the voice, to the various provisions for producing vibration in the different wind instruments. No sound is produced by blowing into a tube through a simple opening; the only effect is a motion of the air, incapable of producing sound, unless it meets with a body susceptible of being thrown into vibration. It is, moreover, ascertained that the sides of the instrument are not the vibrating parts: for the substance of which they are composed, or the manner in which they are held, produces no change in the tone or key. On examining the parts, to which the mouth is applied, in the various wind instruments, it appears, that vibrations are produced in the air contained in the tube, as they are in the external air; that is, the intervention of an elastic body is necessary, which the blowing of the player agitates, and the vibrations of which are communicated to the air in the tube; or at least some angular body, against which the air may break as it passes with violence, and thereby be thrown into vibration. In the flute with a mouth piece, in organ-pipes of various kinds, in the hautboy,

hautboy, bassoon, &c. in trumpets, horns, &c. there are different provisions of this kind, to which the chordæ vocales are perfectly analogous. The tube then produces no found itself, it only modifies, directs, or augments that which it produced at its embouchure by the sonorous body against which the air breaks. The trachea of an animal is a continuous tube without any contraction, or any piece susceptible of vibration, except at its upper extremity, or the glottis. As the found is only formed at the end of the trachea, that tube cannot serve to modify it; it can only be compared to the pipe of the bellows of an organ, or to any canal which may convey air to the embouchure of the instrument; and the only part of the vocal organ in the mammalia, which can be compared to the tube of one of our wind instruments, is that placed in front of the glottis, *viz.* the mouth and nasal cavity. If we consider, not only the want of resemblance between these two cavities and all the instruments which we are acquainted with, but also the almost infinite number of means by which we can change their length, diameter, figure, and vents,—means which it is almost impossible to determine with sufficient exactness to deduce from them physical consequences, we shall not be surprised at the difficulties which the theory of the human vocal organ presents.

But the mere passage of the air through the glottis is not sufficient for the purposes of this function. The voice connects us with the individuals of our own species, enables us to communicate our thoughts to them, and must, consequently, be under the regulation of the will. Hence it is produced by voluntary motion, and does not take place except under the influence of volition. We are constantly breathing during sleep, without the production of any found: and we may expire, as strongly as we please, in the waking state without the voice being formed, until we exert a particular act of volition. Again, although the whole structure of the larynx is entire, the ligature or section of the recurrent nerves, or of the nerves of the eighth pair, destroys the voice. An injury of one nerve destroys half the vocal powers, but the voice is completely lost by operating on both. Galen performed this experiment repeatedly on pigs: Vesalius, and other more modern physiologists, have ascertained that the effects are correctly stated by Galen. In short, all the changes and conditions of the vocal organs, of whatever description, necessary to the production and modification of found, are produced by the muscles of the part, under the influence of the will. The exact nature of the muscular motions, required for producing the voice, is not known. Bichat observed, in the experiments already alluded to, that the rima glottidis was contracted whenever a found was uttered; and that this contraction was the more sensible, in proportion as the found was stronger. He states that it never was dilated during the formation of found. He observed, moreover, that inspiration and expiration were constantly attended respectively by dilatation and contraction of the glottis.

The air expelled from the lungs through the opening, prepared for its passage by the action of its proper muscles, throws the sides of this aperture, the chordæ vocales, into a state of vibration: the same effect is produced in the larynx, whose cartilaginous structure renders it particularly susceptible of such vibrations, and in all the surrounding organs. The found produced by the tremulous motions of all these parts is the voice. Hence we understand why hoarseness and smallness of the voice accompany catarrhs, in which the unusual coverings of mucus render the parts less susceptible of vibration; why those animals which have the greatest quantity of cartilage and the least membrane in

their vocal organs, have the strongest and most sonorous voices, and *vice versa*? We see also that all animals provided with a pulmonary organ will have a voice; since nothing more is required, for the production of this found, than the accumulation of air in some receptacle, its expulsion in a mass, with a certain force, and its meeting on its passage with elastic and vibratory organs. Fishes, which have gills, and insects, in whom the distribution of air is by means of tracheæ, produce no found.

It seems impossible to explain how the passage of air through the human glottis should produce vocal sounds distinguishing man from all other animals, and how each animal should have his peculiar and characteristic voice, where the differences of structure, in a part of such simple formation, must be very slight. Yet it seems true that the glottis alone produces the specific character of the voice in each animal. Numerous and respectable authors affirm, that the inflation of air through the glottis is sufficient, even in the dead animal, to produce its particular voice: this has been asserted of the human subject, the cow, pig, cat, rabbit, hare, goose, and frog. It is directly adverse to what we have already stated concerning the necessity of some muscular action to the production of the voice, and is so contrary to those principles, by which these functions are subjected to the will, that we cannot help doubting the whole assertion. After reciting what others have stated, Haller adds, “with me these experiments have not been so successful: I have sometimes obtained a found, that might be recognised as the voice of the animal, but could never imitate the character of the voice in the pig or dog, and much less in man.” *Elem. Physiol. lib. ix. sect. 3. § 4.*

As the found, formed in the larynx, or the voice, proceeds through the mouth and the multiplied hollows of the nostrils, it undergoes various modifications, according to the nature of these parts, which produce in it changes affecting its key or pipe.

Ventriloquism is, perhaps, one of the most singular phenomena connected with the vocal functions; and certainly one, of which the nature is very little understood. This name, as well as the Greek term of *engaltri-muthism*, proceeds on the supposition that the found comes from the abdomen: but we cannot doubt, in general, that the vocal organs alone are concerned, however unable we may be to explain the exact nature of the process. Ammann, the Swiss, whose philosophical labours on the subject of language, and particularly in the instruction of the deaf and dumb, entitle him to much confidence, says, that he saw an old woman who could speak during inspiration, and others have explained ventriloquism in the same way. We believe that the point has not been sufficiently ascertained by actual observation: and others, in their attempts at explanation, even suppose that it is produced, like ordinary speech, during expiration. Some conceive that the tongue is fixed, and that some motions of the pharynx and velum palati do the business. Richerand observed, that a man who could give a dialogue between two speakers, with different voices, as if placed at some distance from each other, did not inspire while he was doing this, but that he expelled air in much smaller quantity than usual. The same author observes, that a Mr. Fitz-James, who possesses the power of ventriloquism in wonderful perfection, does it by means of an extremely gradual expiration, in which the air is brought out in a very slender stream. He precedes this by a very deep inspiration: hence a full state of the stomach renders the exertion of his talent difficult, which all individuals, who have had the art in question, seem to experience. By accelerating or retarding the exit of this air, Mr. Fitz-James

## L A R Y N X.

can imitate different voices, make his auditors believe that the interlocutors in a dialogue, which he carries on alone, are placed at different distances, and produce the most complete illusion on these points. See Richerand, *Elemens de Physiologie*, § 2, p. 339.

In hawking the air is violently forced, by a kind of interrupted action, through the trachea, larynx, and fauces, so as to detach the secretions of the parts, or any thing else which lies on the surface. The peculiar noise is produced by the air thus violently dashed against the parts.

Snoring is produced by a kind of tremulous oscillation of the velum palati, generally in inspiration, but sometimes also in expiration. Whining, or the plaintive sound produced in weeping, is the consequence of tremors of the soft palate, gradually diminished in force as the air is expired.

In humming the mouth is closed, and the expired air enters the nasal cavities with tremulous motions of the muscles of the fauces.

When the tongue is drawn upwards and pressed against the palate, and then suddenly depressed, so as to allow the air to pass quickly, the noise called chuckling takes place. By drawing the lips between the teeth, and then quickly separating them, we can imitate the trot of the horse; and by exercise we can even produce a sound like the clapping of hands.

When we wish to ascertain the odorous properties of any body, we sniff at it; that is, the inspired and expired air is conveyed through the nose with a tremor of the alæ nasi causing a particular noise.

Hissing is produced by expelling the air between the teeth, when brought close together.

In whistling, the tongue is rendered concave on its superior surface, and applied to the bony palate, and upper teeth, so as to have a passage for the air between it and those parts; the lips are at the same time contracted into a round aperture; and the point of the tongue is in contact with the front lower teeth. The vibrations of the parts through which the sound passes produce the peculiar effect, and the motions of the tongue and lips increase or diminish the dimensions of the openings through which it passes. The production of a loud sound requires a large quantity of air, a strong and accelerated expiration, and a considerable tremor of the chordæ vocales. The lungs must therefore be large and admit easily of distention; the trachea and larynx must also be ample, and the reflexion of the sound in all the passages unimpeded. A distended state of the stomach is unfavourable to the production of such sounds, as it impedes the descent of the diaphragm. The impervious state of the lungs in the consumptive must be equally unfavourable; and we accordingly find that the voice becomes weaker, as the disease advances.

In forming high or acute sounds, a contracted state of the glottis, with tension of its ligaments, are required; the air passes rapidly through the narrow opening, and numerous oscillations of its sides are produced. The whole larynx is carried upwards and forwards; and, in uttering the most acute sounds, the head is thrown backwards, that the larynx may be elevated through a wider range. This elevation equals nearly half an inch for one octave. That the changes above-mentioned take place, is proved, by placing the finger on the larynx, which gives us immediate demonstration of its ascent, when we utter acute sounds; by the comparatively acute voice of children and women, in whom the larynx is small, and the glottis consequently narrow; by comparative anatomy, which shews us that the glottis is small and narrow in singing birds, large and relaxed in ani-

mals which utter deep sounds; by the blowing of wind instruments, in which the opening for the passage of the air is always contracted in order to produce the high notes; and also by this general fact, that the sounds are always more acute in proportion as these instruments are of smaller size.

If we talk too impetuously, the quick passage of the air throws the chordæ vocales into too rapid oscillations, and the voice suddenly becomes exceedingly shrill. These changes have nothing to do with the loudness of the sound; a weak as well as a strong sound may be either acute or grave in its tone.

In the production of deep or base tones, an opposite state of parts is required; the larynx is carried downwards, and the head itself brought towards the chest. This descent, like the ascent, is about half an inch for an octave. In the male sex, where the larynx is larger, and the glottis consequently more ample than in the female, the voice is habitually deeper toned. Eunuchs and women may be taught to sing soprano, but not bass. When very low tones are formed, in which the chordæ vocales are greatly relaxed, the production of sound ceases altogether.

A human voice that has been much exercised, can pass through about two octaves and a half in either direction from the middle; and consequently it has a range in the neck of nearly three inches.

The question has been much agitated among physiologists, whether the changes of tone in the voice depend on alterations in the diameter of the opening, or in the state of tension of the ligaments forming its sides. By the advocates of the former opinion, the organ of the human voice is compared to wind instruments, in which the enlargement of the aperture renders the sound grave, and its diminution acute; and by those of the latter to stringed instruments. We admit, in the preceding account, the efficacy of both kinds of changes, but we consider the alterations in diameter as the most efficient. The change of the voice from acute to grave, at the time of puberty, when the larynx undergoes a remarkable development, as well as its acuteness in females, whose glottis is less by one-third than that of man, shew that the size of the aperture has a great influence. Observing, on the other hand, that the chordæ vocales admit of considerable tension and relaxation, we must allow that these variations will render them susceptible of executing, in a given time, vibrations more or less extensive and rapid. And although they are neither dry, stretched, nor isolated, which are necessary conditions to the production of sound in those stringed instruments to which the larynx has been compared, yet they are analogous to vibrating bodies placed at the top of wind instruments, as the reed in hautboys, the mouth piece in flutes, &c. and equally contribute to the formation and varied inflexion of vocal sounds. Haller, in his *Elementa Physiologie*, lib. ix., has given a long and very instructive account of the whole controversy. We shall be surprized at seeing how very small a change can alter the tone, when we reflect that the breadth of the rima glottidis does not exceed a line at its broadest part, and that there is an almost innumerable variety of tones distinctly perceptible.

Singing is the expression of love and joy, common to birds with the human subject. The pronunciation of words or letters is not essential to its nature. It includes the greatest variety of acute and grave sounds, and the most rapid transition from the one to the other. In general the tone of singing is more acute than that of talking. The great difference between these two modes of vocal exertion is in the transitions of singing; in order to execute these, the larynx, instead of resting, is sustained in a kind of equilibrium between the elevating and depressing powers. A person will soon

perceive this by placing his finger on the larynx while he sings, or by observing the throat of another. As singing requires the exertion of many muscles, it soon fatigues. It also exercises the muscles of respiration; as a large quantity of air is frequently required. The rapid passage of the air in singing dries the parts quickly.

Speech is the formation of the voice, produced, as we have already described, by means of the organs about the throat, nose, and mouth, into articulated sounds, by which men communicate their thoughts to each other. All animals have a voice, but man alone speaks in the sense now alluded to. Some, indeed, which have a broad tongue, have been taught to pronounce a few words; but they express no thoughts by these sounds. We believe that no sufficient reason can be drawn from organization, why man invariably should possess, and animals invariably want the power of speech.

The tones are not so quickly changed as in singing, consequently the larynx is much less moved. Recitative is a kind of mixture of singing and speaking, partaking equally of the characters of each.

If we consider a letter to be a sound, that cannot be resolved into more simple elements, speech is the formation of the voice into the sounds expressed by letters, and the composition of words from these.

Letters are divided into vowels and consonants. The former (vocales) are produced simply by the voice passing through the mouth opened to a greater or less degree, without the tongue being applied to the lips or to any other part. These sounds are produced in laughing, and something like them may be observed in the voices of animals.

In the formation of the vowels, the passage through the nose is closed; the voice proceeds straight through the tongue and lips, and the mouth is open. The larger the space left for the voice along the tongue and through the lips, or the lower the tongue is placed in the mouth, and the wider the lips are apart, the more deeply do the vowels sound. These sounds are the most clear and distinct, because the canal, through which they proceed, is free and unconfined in every direction.

The consonants are sounds pronounced with the vowels, and modifying or limiting them. They must therefore have vowels either before or after them. The sound of the vowel in these cases is altered by the tongue being applied to some part in the cavity of the mouth, striking against the teeth or lips, &c.

The consonants are distinguished into different classes according to different principles of arrangement. Soemmering gives the four following classifications.

I. 1. Nafales; *m, n, ng.* 2. Orales; *l, r.* 3. Sibilantes; *f, g, b, ch, s.* 4. Explosivæ; *b, d, k, p, q, t.* 5. Composite; *x, z.*

II. 1. Nafales; *m, n, ng.* 2. Liquidæ; *l, r.* 3. Mutæ; *f, b, ch, s, z, sch, th, v, w.* 4. Explosivæ; *b, p, d, t, k, g.*

III. 1. Mutæ; *k, p, t.* 2. Explosivæ et vocales; *g, r.* 3. Explosivæ; *f, h, s, sch.* 4. Vocales; *b, d, g, l, m, n.*

IV. 1. Gutturales; *g, ch, h, th.* 2. Palatinæ; *d, l, n, r.* 3. Labiales; *b, f, m, p, w.* De corp. hum. fabrica, t. 6. p. 110.

To point out the motions by which all these sounds are produced, would lead us into too wide a field. We refer the reader to the work of Soemmering already quoted, and to Haller's *Elementa Physiologiæ*, lib. ix.

The remarkable change which occurs in the voice, at the time of puberty, must be referred to the sudden development which the organ undergoes at that time, as we have already stated. The various affections of the mind are accompanied

by the utterance of particular sounds; and this is strongly seen also in animals. In them, the wants connected with the generative functions, afford the most frequent cause for the exertion of the vocal organs. But we may observe further, both in birds and quadrupeds that certain modifications of the voice express fear and anger, affection for the off-spring, joy and pain, that others are used in calling the assembly together, and, in the case of gregarious animals, in imparting to each other something which we do not understand. Similar vocal expressions of what is passing internally are observed also in the dumb, who have not learned to speak; and even animals distinguish in man the sounds denoting anger, approbation, &c. In the sounds which we utter, on many of these occasions, in civilized society, there may be something arising from imitation or habit, or referable in some way to a conventional origin; but much of it is so completely inartificial, that we seem to obey merely a species of instinct, and to express the simple voice of nature. Various malformations and diseases of the organs concerned in speech impair or entirely destroy the power of pronunciation. From the important share which the tongue has, in producing articulated sounds, we should expect that extensive injuries of it would be very injurious in this way. But experience shews us that it may be very extensively injured without greatly impairing the powers of speech. Indeed several letters may be pronounced without its aid. Mr. Louis has collected several cases in his "Mémoire physiologique et pathologique, sur la Langue;" in proof of this point, he states, that after very serious injuries the power of speech was at first greatly impaired; but that it gradually returned. *Mémoires de l'Acad. de Chirurgie*, t. v.

Stammering may be caused by too large and thick a tongue, by great length of the frænum; by any causes that impair the motions of this organ, whether they be referrible to organization, or to the state of the nervous system, as in drunkenness, apoplexy, &c.

Too great confinement of the organ, by its frænum, sometimes prevents children from learning to speak.

Want of the front teeth, as well as undue size of the tongue, produces lisping.

The confinement of the tongue in the aged, consequent on the diminution of the cavity of the mouth from the loss of the teeth, very much impedes the powers of pronunciation.

When we assign certain organical defects, as the causes of defective pronunciation, we do not mean to assert that this is constantly true. A person who stammers, for example, will often be able to speak clearly, if he will speak slowly.

The obstruction of the passage of the sound through the nose, either by closing the front openings of the nostrils, or by the elevation of the velum palati behind, produces a peculiar modification of the voice, which is strangely enough termed, in common language, speaking through the nose. Diseases of the palate, or its velum, ulcerations, and preternatural openings in them, have also very considerable effect on the voice; the same may be observed of disease affecting the bones of the nose.

Dumbness may be accidental, or may subsist from birth. In the former case, it arises from organic injury, which either affects the mechanism of the parts, or which intercepts the communication between the vocal muscles and the brain. In dumbness from birth, deafness seems to be always the cause; so that the absence of speech should here rather be called silence. This, at least, is constantly the case, according to the observation of Sicard on the numerous pupils committed to his care. Here there is an absolute ignorance of sounds, and of their representative value in letters of the alphabet. The vocal organs exhibit no marks of deficiency; they

they are fit, in short, to fulfil the uses for which nature has destined them, but they remain in a state of inaction, because the deaf infant is not conscious that he has the means of communicating his thoughts. See the article DUMBNESS.

Dichat, *Anatomic Descriptive*, t. ii. Soemmering, *De Corporis humani fabrica*, t. vi. Haller, *Elementa Physiologiae*, lib. ix.

LASAIÀ, in *Geography*, a town of Naples, in Principato Citra; 21 miles S.S.W. of Cangiano.

LASANON, a word used by different authors in very different senses; some applying it to the trivet commonly used in kitchens; others to a close-stool; and others, among whom are Hippocrates, and the ancient physicians, for a sort of chair, contrived for a woman in labour to sit in, as being so made, that the weight of the child, when born, shall help to draw away the fecundines.

LASCARIS, CONSTANTINE, in *Biography*, a learned descendant of the imperial family of that name, was born at Constantinople. He quitted his native city when it was taken by the Turks in 1454, and went to Italy, where he was most amicably received by duke Francis Sforza of Milan, who placed his own daughter, a child of ten years of age, under the care of Lascaris for instruction in the Greek language. For her use he composed his Greek grammar. From Milan he went to Rome, and from thence, at the invitation of king Ferdinand, he repaired to Naples, where he opened a public school for Greek and rhetoric. Having spent some years in this employment, he was desirous of repose, and embarked with the intention of settling at a town of Greece; but having touched at Messina, he was urged by such advantageous offers to make it his residence, that he complied, and passed there the remainder of his days. Here he received the honour of citizenship, which he merited by his virtues as well as his learning, and by the influx of scholars which his reputation drew thither, among whom was the celebrated Bembo. He lived to a very advanced age, but the time of his death has not been exactly ascertained. He bequeathed his library to the city of Messina. His Greek grammar was printed at Milan in 1476, and was the first book that issued from the Italian press. A better edition of it was given in 1494, by Aldus Manutius: Erasmus considered it as the best Greek grammar then extant, excepting that of Theodore Gaza. Lascaris was author likewise of two tracts on the Sicilian and Calabrian Greek writers.

LASCARIS, JOAN ANDREW, a learned Greek of the same family with the preceding, came over to Italy, on the ruin of his country. He studied at Padua, obtained a high reputation for his knowledge in the learned languages, and received the patronage of Lorenzo de Medici, who sent him into Greece with recommendatory letters to sultan Bajazet, in order to collect ancient manuscripts. After the expulsion of the Medici family from Florence, in 1494, he was carried to France by Charles VIII., after which he was patronized by Louis XII., who sent him, in 1503, as his ambassador to Venice, in which office he remained till 1508. He joined the pursuit of literature with his public employment, and held a correspondence with many learned men. After the termination of his embassy, he remained some years at Venice, as an instructor in the Greek language. On the election of pope Leo X. to the papedom in 1513, he set out for Rome, being persuaded that he should meet with a favourable reception from that patron of learning. At the invitation of Lascaris, Leo founded a college for noble Grecian youths at Rome, at the head of which he placed the author of the plan. In 1518, he quitted Rome

for France, whither he was invited by Francis I.; here he was employed by the monarch in forming the royal library. He was also sent as his ambassador to Venice, with a view of procuring Greek youths for the purpose of founding a college at Paris similar to that of Rome. After the accomplishment of other important missions, he died at Rome in 1535, at an advanced age. As an author he composed epigrams in Greek and Latin; he translated into the Latin language, a work extracted from Polybius, on the military constitutions of the Romans; and he printed at Florence a magnificent edition of the Greek Anthologia. By his contemporaries he was greatly praised, on account of the eminent services which he performed for the extension of literature.

LASCHE, in *Geography*, a town of Bohemia, in the circle of Chrudim; eight miles E. of Chrudim.

LASCHI, in *Biography*, an admirable singer and actor in the first burletta band of singers which arrived in England during the autumn of 1748, when serious operas were discontinued by the abdication of lord Middlesex, who was as unsuccessful in his opera regency, as James II., in endeavouring to establish the Roman Catholic religion in this country.

The new troop consisted of Pertici, as *buffo caricato*, Lafchi, *tenor*, and Guadagni, *counter tenor*, (then very young,) as serious men. Frasi, and afterwards, Mellini, for serious women; and the comic female parts by the wives of Pertici and Lafchi, the two best comic actors we ever saw on any stage, formed a very good troop, and in the comic operas of "La Comedia in Comedia," "Orazio," "Don Colafione," "Gli tre Cicisbei Ridicoli," &c. composed by Latilla, Mitale Resta, and Ciampi, who came over as maestro to the company, pleased the public and filled the theatre very successfully during the whole winter. Lafchi was certainly the best first buffo, except Lovatini, that has ever appeared on our stage; and the acting of him and Pertici was undoubtedly the most amusing and ingenious that can possibly be imagined.

LASCIGO, in *Geography*, a town of Naples, in Principato Citra; 18 miles W. of Policastro.

LASCO, JOHNS A., in *Biography*, a zealous promoter of the Reformation, was born in Poland, of a noble family, about the close of the fourteenth century. He received the early part of his education in his own country, and then travelled into foreign parts for improvement. In Switzerland he became acquainted with the celebrated Zuingli, by whose influence he determined upon studying divinity, and having by the example of his friend imbibed the spirit of the reformation, he returned home with the design of propagating the principles which he regarded as having their foundation in important truth. At first he was promoted to a high station in the Catholic church, and at length was nominated bishop of Vespriem, in Hungary. His honours, probably, did not sit easy upon him, and he determined to make an open avowal of his sentiments; by this decided course he drew upon himself the vengeance of the Catholic bishops, who did not hesitate to pronounce him an heretic. He appealed to the king, but the sovereign was either unable or unwilling to extend the shield of his authority in protecting his bishop, and he was obliged to quit Hungary in the year 1540. In 1542, he was chosen minister of a church at Embden, and in the following year he went to Oldenburgh, to establish the doctrines and discipline of the reformation in that district. In 1544, he was invited into Prussia, by duke Albert, for the same purpose, but as he was not altogether a Lutheran, he was obliged to relinquish this mission and to return to Friesland. Here he resided about ten years,

when the publication of the Interim by the emperor Charles V. compelled him to seek another asylum, which he found in England, on the invitation of Edward VI., which was conveyed to him by archbishop Cramer. Here he became minister to a German Protestant church, which assembled for divine worship at Auln-Fryars. Of these Protestants, almost four hundred were admitted to the honour of citizenship; they were not tolerated, but guaranteed by royal patent, in the conscientious discharge of their duties to God, while numbers of his majesty's natural born subjects were grievously persecuted on account of their inability to join in all the ceremonies enjoined by the established religion. The preamble to the patent referred to, is a curious document considering the times; it admits that the German church made profession of pure and uncorrupted religion, and was instructed in truly Christian and apostolical opinions and rites, and it was permitted them to enjoy and exercise their own rites, ceremonies, and discipline, though they were different from those used in this kingdom. Lasco avowed the same opinions as those held by Hooper, Latimer, and other illustrious divines of that day: he was, however, permitted to live in peace during the reign of the youthful monarch; but upon the accession of the infamous Mary, he and his congregation were ordered to leave the kingdom. They embarked with their families and property, and at the commencement of a very severe winter arrived off the coast of Denmark, but were not permitted to land on account of their known tenets. For the same reason they were refused an asylum at Lubec, Hamburg, and some of the cities of Saxony; at length, after they had been driven from place to place, they were hospitably received at Embden in March 1554. In the following year Lasco went to Frankfort upon the Maine, and obtained leave from the senate to build a church for foreign Protestants. In 1556, he wrote a letter to Sigismund, king of Poland, in vindication of himself and his doctrines, from certain misrepresentations which had been circulated by his enemies. In 1557, he published an apology for the church of the reformed Protestants at Frankfort, on the subject of the variation in their creed from that of the confession of Augsburg with respect to the Eucharist. He was answered by Westphalus, who, feeling that he had the weakest side of the argument, exhorted the senate to interpose its power, and to withdraw its protection from the disciples of Zuingle, whom he denominated rank heretics, and the Devil's martyrs. Lasco, after a thousand vicissitudes, returned to his native country; but scarcely had he arrived, when the bishops and other ecclesiastics set about every method to ruin him. A synod was convoked to meet at Warlaw; the result of their deliberations was, that Lasco was a heretic; he was accused before the king, and a petition was drawn up praying that he might be banished. The sovereign nobly rejected their demand, and he was permitted to live free from persecution, though he was daily assailed by the dark calumnies of his enemies. He died in 1560, leaving behind him many works which testify that he was a man of great talents and profound learning. He was the friend of Erasmus, who acknowledged the obligations he was under to him; and Peter Martyr calls him his most learned patron. He was highly esteemed, and frequently consulted by Sigismund, king of Poland; and he is commended by contemporary historians as a man possessing many virtues, and the most unaffected piety. Gen. Biog.

LASCORIA, in *Ancient Geography*, a town of Asia, in Galatia, belonging to the Trocmi. Ptolemy.

LASDIPELEN, in *Geography*, a town of Prussian Lithuania; nine miles N. of Pilkabena.

LASER CYRENAICUM, in the *Materia Medica*, a name supposed to be given by the ancient Greeks to the gum we at this time call *assa fetida*. The word *assa*, or, as it was originally written, *asa*, was evidently formed on the *laser* of the Greeks; but there was also an *asa* mentioned by the old authors very different from this, being a fragrant and sweet-scented gum. This sweet gum was evidently the *laser* and *asa*, or *assa*, of the ancient Greeks: and the *silphium* was the plant which produced it. This plant grew in Cyrene, and furnished it a long time; but in the days of Pliny it was in a manner lost. The people of Cyrene found it more profitable to feed their cattle upon the *silphium*, than to gather its gum.

Pliny continues to tell us, that by the feeding cattle on this plant, it was perfectly destroyed, in a course of years, that there had been, of a long time, only one plant of it seen, and that reckoned to great a curiosity, that it was sent as a present to the emperor Nero.

When Cyrene no longer afforded the *silphium*, it was sought for in other places. The original *asa*, or *laser*, had the smell of myrrh, but more mild and agreeable; and the *asa* of succeeding times had that of leeks or garlic, and thence was distinguished by the name *scorado laserum*.

LASERPITUM, in *Botany*, *Laserwort*; an ancient name of uncertain derivation, synonymous with the *σαλπις* of the Greeks. *Lac serpitum*, alluding to its milky juice, or *lactipitum*, because that milky juice has a pitchy smell, both suggested by etymologists, afford little satisfaction. The word is evidently compounded of *Laser*, the name of the gum which it produces, and from which *Asa* is by some thought to have been corrupted. Hence *Asa fetida* has been supposed the true *Laser*, or gum of the *σαλπις*, which is known to be of a fetid nature. Ambrosinus asserts *Laser* to be a corruption of *Lactir*, from *lac*, milk. Whatever the *σαλπις* of the Greeks, or the *Laserpitium* of the Latins may have been, the *Silphium* of modern botanists is a genus of the syngenesious class, and the *Laserpitium* is one of the umbelliferous tribe, of which we are now to speak. It so far accords with the ancient plant, that several of its species discharge, when wounded, an acrid and strongly scented resinous gum.—Linn. Gen. 136. Schreb. 186. Willd. Sp. Pl. v. 1. 1414. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 138. Sm. Prodr. Fl. Græc. Sibth. v. 1. 191. Juss. 222. Tourn. t. 172. Lamarck Illust. t. 109. Gært. t. 85. (Siler; Gært. t. 22.)—Class and order, *Pentandria Digenia*. Nat. Ord. *Umbellate*, Linn. *Umbellifera*, Juss.

Gen. Ch. *General umbel* very large, of from twenty to forty rays; *partial of many rays*, flat. *General involucreum* of many leaves, small; *partial of many leaves*, small. *Petioles* of five teeth, scarcely discernible. *Cor. Universal* uniform; and all the flowers fertile; *partial of five spreading*, nearly equal, petals, their points bent in so as to form the shape of a heart. *Stem*. Filaments five, bristle-shaped, the length of the corolla; anthers simple. *Pist.* Germen inferior, roundish; styles two, rather thick, pointed, distant; stigmas obtuse, spreading. *Peric.* Fruit oblong, with eight longitudinal membranous angles, separable into two parts. *Seeds* two, very large, oblong, semicylindrical, flat on the inner side, furnished each with four dorsal and marginal membranes on the other.

Eff. Ch. *Involucreum* both general and partial. Fruit oblong, with membranous angles. Petals uniform, inflexed, emarginate, spreading.

The species of *Laserpitium* are in general of a larger proportion, with more ample foliage, than most other umbelliferous plants. To this nevertheless there are some exceptions,

## LASERPITUM.

tions, for we perceive a prodigious difference between the gigantic *L. aquilegifolium*, Jacq. Austr. t. 147, and the little *L. simplex*, Jacq. Misc. v. 2. t. 2. The 14th edition of Syll. Veg. has fourteen species, comprehending Forster's genus *Alephylla*; Willdenow has twenty-three. In each of these lists, however, there are some ambiguous or doubtful plants, which, from variations incident to this tribe, relative to the occasional absence or presence of an involucre, are supposed to be described twice over in the Linnæan system. Such is the case with *L. Chironium*, suspected to be the same as *Pastinaca Opopanax*, we believe justly. Willdenow doubts whether *L. Archangelica* of Jacquin, Ic. t. 58, be distinct from this plant of Linnæus, but we are quite clear on this point, and are almost as perfectly satisfied that *L. Chironium* is *Pastinaca Opopanax*, which last name Linnæus, in his note on the subject, has accidentally written *Coffina*, apparently from having Bauhin's synonym in his head; yet Reichard, Willdenow, and Laicharding copy him without reflection or remark.

Indubitable species of *LasERPitum*, which will serve to give a competent idea of the genus, are the following. None are natives of Britain.

*L. latifolium*. Broad-leaved Laserwort. Linn. Sp. Pl. 356. Jacq. Austr. t. 146. (*Libanotis Theophrasti* major; Ger. em. 1010.)—Leaflets obliquely heart-shaped, undivided, with sharp-pointed teeth.—Native of mountainous dry woods in various parts of Europe, flowering in July, ripening feed late in autumn. Jacquin observes that it varies greatly in size and roughness, being only a foot or two high on the Alps, while in less elevated situations it rises to four or five feet, with ample and handsome foliage. He asserts also that wild plants of a very rough habit, on being brought into the garden, became smooth the next season. Hence he determines the *L. asperum* of Crantz, Diff. fasc. 3. 50. t. 1. f. 2, and *glabrum* of the same author, 54, to be one and the same species. This f. 2. of Crantz very correctly expresses a leaflet of our plant, such as is preserved in the Linnæan herbarium, and exhibited by Jacquin as above. The radical leaves are twice or thrice compound, with large, heart-shaped, stalked, undivided leaflets, unequal at the base, veiny, from one to two or three inches long; smooth and dark green above; paler, and more or less rough with rigid bristles, beneath; the margin beset with strong broad sharp serratures, the base entire. The stem is smooth and round, bearing a few smaller more entire leaves, whose common stalk is greatly dilated and inflated at the base. The umbels are broad. Flowers small, white. Wings of the seeds, according to Jacquin's plate, even, and scarcely at all undulated, rounded not angular at their summit, agreeing very well with the first figure of the seed annexed to Morison's Sect. 9. t. 19. f. 1, so that, if he be right, his whole fig. 1. must belong to our plant, though it is not a very good one. We cannot help thinking too that the *LasERPitum* of Rivinus, Pentap. Irr. t. 21, is the same species. Professor Willdenow, however, seems to have been led by Crantz and Lamarck to establish another species, by the name of *L. Libanotis*, for which he quotes this plate of Rivinus, as well as another figure of Morison, Sect. 9. t. 19. f. 6. This he supposes to be the *glabrum* of Crantz, who cites as a certain though rude figure *Libanotis alpina latifolia, semine crispis*, Bocc. Mus. 24. t. 3. The plant of Boccone, according to all appearance, we have from Italy, and can aver its being totally different from *L. latifolium* and all the synonyms of Willdenow's *L. Libanotis*, being, as far as we can tell, not yet defined by any systematic author. The wings of its seeds, though called *crispis*, are nearly even, and terminate in a lateral angle at

the top, like Morison's t. 19. f. 6, which may possibly be a bad delineation of Boccone's plant. Willdenow does not mark his *L. Libanotis* as one that he had seen, and he might well be led into confusion by the writers on whom he has depended. Among these the most blameable is Crantz, who roundly asserts his *asperum*, (our *latifolium*), to be *L. Chironium* of Linnæus, which we can positively contradict, and which nobody but Lamarck has believed. The latter seizes with alacrity the opportunity of censuring Linnæus on the subject of his synonymy, though in this instance unjustly, while he himself describes under the name of *L. Libanotis*, with extremely confused synonyms, what appears clearly by his account to be *L. trilobum* of Linnæus, of which we shall now speak.

*L. trilobum*. Three-lobed Broad Laserwort. Linn. Sp. Pl. 357. (*L. Libanotis*; Lamarck Dict. v. 3. 423, by the very excellent description. Ligusticum Rauwollii, foliis aquilegiæ; Bauh. Hist. v. 3. p. 2. 148. Pluk. Phyt. t. 223. f. 7. Siler foliis aquilegiæ; Rivin. Pentap. Irr. t. 64.)—Leaflets broad-ovate, three-lobed, cut and sharply ferrated.—Native of Italy, and we believe also of Switzerland; though Professor Lachenal, from whom we have a specimen of the true plant, assigns the n. 793. of Haller, taken for this, to be only a variety of *latifolium*, which according to him has occasionally two or three lobes in its lower leaflets. A Swiss specimen from Schleicher seems to be the real *trilobum*, but it wants the lower leaves, and therefore cannot be absolutely determined. The leaflets of *L. trilobum* differ from the foregoing, in being by no means heart-shaped at the base, but either ovate or tapering, and more or less deeply three-lobed, sometimes to the very base; as well as cut and sharply ferrated. The umbel is very large and spreading, with long purple rays. Flowers small, white. Wings of the seeds even, and very narrow. Lachenal seems, when he wrote his remarks above alluded to, in Ag. Helvet. v. 8. 145, not to have distinguished this from the following, though they are widely different.

*L. aquilegifolium*. Great Columbine-leaved Laserwort. Jacq. Austr. v. 2.—Leaflets sessile, rounded, bluntly lobed and cut. Wings of the seed very narrow.—Native of Austria, Switzerland, and the Bithynian Olympus, first well determined by Jacquin. It is five or six feet high, with ample leaves, much resembling those of a Columbine in their rounded obtuse form and segments. The umbels are very large and spreading. Flowers white. Wings of the seeds even, and very narrow. Crantz makes it a *Siler*, and misquotes under it synonyms which belong to the last, and which he therefore justly says "could never be guessed to belong to the present." Why then, as they certainly do not, are they quoted?

*L. Siler*. Mountain Entire Laserwort. Linn. Sp. Pl. 357. Jacq. Austr. v. 2. 27. t. 145. Sm. Prodr. Fl. Græc. Sib. v. 1. 191. (*Siler montanum officinarum*; Ger. em. 1. 48.)—Leaflets elliptic-lanceolate, entire, stalked.—Found on the mountains of Austria, Switzerland, France, Greece, and other parts of the south of Europe. It is of more humble growth than any of the former, and distinguished by the form of its leaflets. The seeds are shaped and winged much as in the last. They are aromatic and very bitter. Haller complains of its being neglected as a medicinal plant, though strong in aromatic virtues.

*L. prutenicum*. Prussian Laserwort. Linn. Sp. Pl. 357. Jacq. Austr. t. 153. Ehrh. Herb. 93. (*L. minus*; Rivin. Pentap. Irr. t. 23.)—Leaflets pinnatifid; their segments lanceolate, acute, decurrent, entire. Stem hispid.—Found in Prussia, Austria, Switzerland, &c. The stem is about two feet high, erect, hairy, as well as the leaf-stalks.

*Leaves:*

*Leaves* light-green, smooth, bipinnate; their leaflets pinnatifid, with elliptic-lanceolate, decurrent, pointed segments. *Umbels* rather large, white, with white-edged involucreal leaves. *Seeds* small, their wings broadish and wavy.

*L. hirsutum*. Hairy Fine-leaved Laferwort. Lamarck Dict. v. 3. 425, with a wrong reference to Linnæus. (*L. Halleri*; Villars. Dauph. v. 2. 625. *L. n.* 705; Hall. Hist. v. 1. 353. t. 19.)—Leaves hairy, many times decomposed, with lanceolate decurrent segments, often three-lobed. Involucreal leaves with membranous fringed edges.—Native of the alpine parts of Switzerland, Savoy, and France. We gathered it on Mount Cenis, flowering in August. The broad, extremely compound, finely cut and hairy leaves, at once distinguish this species. The umbels are large, dense, and white. Wings of the seeds rather broad, pale, and slightly crisped.

**LASERPITIUM**, in *Gardening, &c.* The plants of this genus grow naturally in the south of France, in Italy, and Germany, and are preserved in botanic gardens for the sake of variety; they have no great beauty. It has been generally supposed, that the silphium of the ancients was procured from one species of this genus, but from which of them (if any) we are at present ignorant. All the species, if wounded, drop a very acrid juice, which turns to a resinous gummy substance, very acrimonious. This was externally applied by the ancients to take away black and blue spots that came by bruises and blows, as also to take away excrescences: it was also by some of the ancients prescribed in internal medicines, but others have cautioned people not to make use of it this way, from the effects which they mention to have been produced from the violence of its acrimony.

All these plants are extremely hardy, so will thrive in moist soils and situations. They are propagated by seeds, which, sown in autumn, will afford plants in the spring, that may be transplanted in the following autumn. Miller.

**LASERRA**, in *Geography*, a town of Corsica; 10 miles N.E. of Sarcena.

**LASERWORT**, in *Botany, &c.* See **LASERPITIUM**.

**LASGRUFVA**, in *Geography*, a town of Sweden, in Helplingland; 58 miles E. of Hudwickfwal.

**LASH**, or *to lash*, is to make fast the booms, anchors, &c. by several turns of rope, to prevent their moving by the motion of the ship.

*Lashing*, which also denotes a piece of rope used to fasten or secure any moveable body in a ship, or about her masts, sails, and rigging, is chiefly used for binding up to the ship's side, mulkets, butts of water or beer, or pieces of timber to make spare top-masts.

**LASHERS** are properly those ropes only which bind fast the tackles, and the breeches of the ordnance, when they are haled or made fast, within board.

**LASHOM JAMNAS**, in *Geography*, a town of Egypt, on the coast of the Mediterranean; 12 miles N.W. of Damietta.

**LASIA**, in *Ancient Geography*, an island situated on the coast of Lycias. Pliny.—Also, an island on the coast of the Peloponnesus, over-against Troezen.—Also, one of the names of the isle of Andros.

**LASIA**, in *Botany*, from *λασιος*, hairy or bristly, because the plant is beset with numerous little bristles or prickles. Loureiro. Cochinch. 81.—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Piperite*, Linn. *Aroides*, Juss.

Gen. Ch. *Cal.* Spatha awl-shaped, twisted, coloured, very long. Spadix shorter than the spatha, entirely covered with florets. *Cor.* Petals four, fleshy, obtuse, concave, clovel-embracing the organs of impregnation. *Stam.* Filaments

four, short, flat, hidden by the petals; anthers two to each filament, rounded, concave, protruding beyond the corolla. *Pist.* Germen superior, roundish; style none; stigma rather abrupt. *Peric.* Berry small, roundish, unequal. *Seed* solitary, roundish.

Eff. Ch. Spadix covered with florets. Petals four, fleshy, inferior. Anthers two to each filament. Berry with one seed.

1. *L. aculeata*. Cu chaotic gai, of the Cochinchinese. Native of the moist plains of Cochinchina. A stemless plant, six feet high, with large, pinnatifid, leaves, on long, round, upright stalks. *Flower-stalk* radical, quite simple and naked, about as tall as the leaves. The leaves, and all the stalks are covered with numerous little short curved prickles. Loureiro justly indicates the affinity of this plant to *Pathos*, and no less justly prefers placing it in the fourth class, rather than in *Gynandria*. The prickly pubescence, if we may so term it, is very curious in this family. It is to be presumed the anthers are each of one cell only, or rather that each filament bears one anther, of two separated lobes and cells.

**LASIO**, in *Ancient Geography*, a town of the Peloponnesus, or Triphylia.—Also, a mountain in the island of Crete, on which was the tomb of Jupiter.

**LASIOPETALUM**, in *Botany*, from *λασιος*, hairy, and *πεταλον*, a petal, alluding to the hairiness of the flower.—Sm. Tr. of Linn Soc. v. 4. 216. Venten. Malmais. 59. Billard. Nov. Holl. v. 1. 63. Ait. Hort. Kew. ed. 2. v. 2. 36.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Rhamnii*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, wheel-shaped, hairy, in five deep, equal, ovate, folded, at length expanded segments, permanent, often coloured. *Cor.* Petals five, minute, roundish, inserted into the base of the calyx between its segments. *Stam.* Filaments five, very short, opposite to the petals; anthers terminal, ovate, two-lobed behind, opening by two pores at the top. *Pist.* Germen superior, globose, with three furrows, very hairy; style short, straight, smooth; stigma simple, acute. *Peric.* Capsule invested with the calyx, nearly globose, with three angles, downy, of three cells and three valves, partitions from the centre of each valve. *Seeds* few, roundish, inserted into the inner edge of the partitions.

Eff. Ch. Calyx wheel-shaped, in five deep folded segments. Petals five, minute, opposite to the filaments. Anthers opening by two terminal pores. Capsule superior, of three cells, and three valves, with the partitions from their centre.

Obs. The late excellent M. Ventenat, erroneously quoted as the author of this genus in the new edition of Hort. Kew. has justly corrected its original describer, who mistook for a corolla what is truly the calyx. This correction is the more important, as it leads to a knowledge of the true natural order to which the genus belongs, as given above. M. La Billardiere has observed a species with five intermediate abortive filaments, and no petals.

1. *L. ferrugineum*. Rusty Woolly-blossom. Andr. Repof. t. 2c8. Venten. Malmais. t. 59.—Leaves alternate, linear-oblong, dependent. Flowers racemose.—Native of marshes in New South Wales, from whence the seeds were received in 1791, by Messrs. Lee and Kennedy. It flowers during most part of the summer, being sheltered in winter in the green-house, and allowed but a small supply of moisture. *Stem* shrubby, upright, slender, round, leafy, clothed with dense, rusty, stary pubescence, and, in its native situations, throwing out long, slender, extremely tough branches, to the extent, as it is reported, of many yards, amongst other shrubs.

shrubs. *Leaves* alternate, stalked, dependent, linear-oblong, bluntish, entire or slightly wavy, from two to four inches in length, and half an inch broad; heart-shaped, rather dilated, and often somewhat angular at the base; deep-green and smoothish above; white and downy, with a rusty rib, beneath. *Flowers* in short, lateral, deflexed clusters, nearly opposite to the leaves, with three or more linear rusty bractæa close to each flower. *Calyx* half an inch broad, light green, besprinkled on both sides with dense, flarry, rather rusty down. *Petals* and *anthers* brown. The whole shrub is more remarkable for singularity than beauty. Sometimes, according to Ventenat, the flowers are four-cleft and tetrandrous only.

2. *L. ledifolium*. Rosemary-leaved Woolly-blossom. Ventenat. Malm. at p. 59.—Leaves opposite, linear-lanceolate, spreading. Stalks single-flowered. Bractæa remote from the flower.—Seen by M. Ventenat in the herbarium of M. Thibaud, professor of botany at Strasburgh. We presume it must be, like the former, and all the known species besides, a native of New Holland. It is described as varying with broader and crowded, or narrower and more distant, leaves; and as being remarkable for the situation of its bractæa, in the middle of the flower-stalk.

3. *L. purpureum*. Purple Woolly-blossom. Ait. Hort. Kew. n. 2.—Leaves oval, entire.—Found in New Holland by Mr. Brwn. Sent to Kew in 1803 by Mr. Good. It is a green house shrub, flowering from April to July. Of this we have no further knowledge, not having seen any specimen.

4. *L. a-borefcens*. Nettle-tree-leaved Woolly-blossom. Ait. Hort. Kew. n. 3.—Leaves heart-shaped, deeply toothed.—Native of New South Wales, from whence it was sent by Mr. George Calcy in 1802, through Sir Joseph Banks, to Kew. It flowers from May to July, and is sheltered in the green-house.

5. *L. triphyllum*. Three-leaved Woolly-blossom. Billard. Nov. Holl. v. 1. 63. t. 88.—Leaves three together; the middle one largest and lobed. Stamens ten, the intermediate ones abortive. Petals wanting.—Gathered by M. La Billardiere in Van Lewin's land; by Mr. Menzies at King George's found, on the west coast of New Holland. We received a specimen in flower, by favour of Mr. Aiton, from Kew garden in May last. It is a shrub, kept, like others of its genus, in the green-house. The whole plant is clothed with rather soft flarry pubescence, like some of the mallow tribe, which assumes a rusty hue on the stalks, and on the veins of the leaves. The foliage is remarkable. Three leaves grow on stalks from one spot, (at the sides of the branches), of which the middlemost is much the largest, from one to two inches long and nearly as wide, heart-shaped at the base, more or less distinctly five-angled, or five-lobed, and somewhat sinuated, its footstalk nearly its own length; the side ones are unequally heart-shaped and entire, on very short stalks, and resemble stipulas. Long simple clusters, of several flowers, grow solitarily, opposite to the large leaves, between the small ones. The calyx is bluish-coloured, hairy, with pointed segments. Anthers dark brown, with yellow tips; the barren ones smaller and paler.

6. *L. quercifolium*. Oak-leaved Woolly-blossom. Andr. Repof. t. 459. Ait. Hort. Kew. n. 4.—Leaves three together, all sinuated; the middle one largest and three-lobed, somewhat pinnatifid. Stamens five. Petals wanting.—Gathered by Mr. Menzies, at King George's found, on the west coast of New Holland. Mr. Brown also observed it in that country. Seeds were sent to Kew, by Mr. Peter Good, in 1803. This is most akin to the last, but abund-

antly distinct. The leaves are smaller, somewhat glaucous, and much more harsh, owing to the more rigid and prominent flarry bristles on their upper surface; the three which grow together are more similar in size and figure, being all sinuated, though the middle one is much the most deeply lobed; the edges are slightly revolute. The flowers have their calyx of a deeper rose-colour, with less pointed segments. We perceive no barren stamens, nor any petals.

7. *L. coriocalatum*. Horned Woolly-blossom.—Leaves three together, cut and crenate; the lateral ones very small. Petals with linear points as long as the calyx.—Gathered by Mr. Menzies, at King George's found.—The leaves are more densely and uniformly hairy than in the last, as well as softer to the touch. The flowers are racemose, as in that, but much smaller, and are essentially distinguished by the long prominent linear appendages, or horns, of their petals, which equal the calyx in length, and in its dry shrivelled state extend much beyond it.

Several more species of this genus are in our possession, but we forbear to attempt their definition from imperfect dried specimens, as they will doubtless be more correctly and amply illustrated in the *Prodromus* of Mr. Brown, who has had the advantage of seeing them alive, and whose meritorious labours we never feel a desire to forestall. S.

LASIOSTOMA, so called by Schreber, from *λασιος*, hairy, and *στος*, the mouth, in allusion to the hairiness which covers the upper side of the flower, and surrounds its orifice. Schreb. 75. Willd. Sp. Pl. v. 1. 624. Mart. Mill. Dict. v. 3. (Rouhamon; Aubl. Guian. 93. Lamarck. Illustr. t. 81.)—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Apocynæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, very short, in five deuplicate segments, with two small opposite scales at its base. *Cor.* of one petal, funnel-shaped tube cylindrical; limb in four acute equal segments, villous on their upper side. *Stam.* Filaments four, capillary, villous at their base, inserted into the tube of the corolla; anthers oblong. *Pist.* Germen superior, ovate; style longer than the corolla; stigma obtuse. *Peric.* Capsule orbicular, of one cell, with a brittle bark. Seeds two, hemispherical.

Ess. Ch. Calyx five-cleft. Corolla funnel-shaped, hairy about the mouth. Capsule superior, brittle; of one cell, with two seeds.

1. *L. cirrofa*. Willd. (Rouhamon guianensis; Aubl. Guian. 93. t. 36. Lamarck. Illustr. 322.)—Gathered by Aublet on the banks of rivers in Guiana, bearing fruit as well as flowers in November. *Rouhamon* is the Caribbean name. The woody trunk is seven or eight feet high, with many very long, knotty, opposite branches, climbing over the neighbouring trees, and clothed with reddish down. Leaves opposite, on short stalks, elliptical, pointed, entire, pale, smooth, three-ribbed. Tendrils axillary, simple, rather longer than the leaves, recurved and thickened at the extremity, not always present. Flowers small, white, in axillary tufts. Capsule rather large in proportion, an inch in diameter, yellow.—Jussieu refers this plant to the genus *Strychnos*, apparently with great reason.

LASK, a term used by *Farriers*, for a looseness in horses, often fatal to them.

LASK, or *Lako*, in *Geography*, a town of the duchy of Warlaw; 30 miles N.E. of Siradia.

LASKETS, or LATCHES, in a *Ship*, are small lines, like loops, fastened by sewing into the bonnets and drablers, in order to lace the bonnets to the courses, or the drablers to the bonnets.

LASKING, a sea-term for going large, or veering.

LASNEDOURG, in *Geography*, a town of France, in the department of Mont Blanc, on the Arc, at the foot of mount Cenis, the passage of which is the principal support of the inhabitants. The fun is hidden from this town by the mountain during two months in the year; 20 miles N.N.W. of Sufa.

LASOY, a town of Thibet; 40 miles N.N.W. of Tacpoy.

LASSA, the capital of Thibet, is called by different names, which have occasioned no small degree of confusion. Its proper name, in the language of Thibet, is said to be Baronthala; but the Tartars call it Lassa or Lahassa. Others call it Tonker, and apply the names Lassa and Baronthala to the district which contains Lassa and Putala. Others again give the name of Putala, instead of Lassa, to the capital of Thibet. Rennell says that we ought to apply the name Lassa or Lahassa, to the capital, and to consider Putala as the cattle and palace of the Lama, and his ordinary place of residence. Lassa, which is not considered as a large city, is situated on an extensive plain; the houses are of stone, and are spacious and lofty. The mountain of Putala (La Puta, the hill of Puta or Boodh, *la* signifying a hill in the native tongue), on the summit of which stands the palace of the grand lama, the high priest and sovereign of Thibet, (see LAMA), is about seven miles E. of the city. On the north of Lassa stands another range of mountains, covered with snow, which are clearly seen from Kambala, a very high mountain on the N. of the lake of Palte. Lassa is in the province of Ou, and almost in the centre of Thibet. The river Sanpoo Burrampooter runs at the distance of 24 miles from the city. The royal palace at Lassa is called Laprang, where, among other ornaments, are maps of the various provinces, painted about 1665, by the orders of the king Tifri, on 16 walls. Laprang is also one of the celebrated academies or schools of Thibet, which are frequented by the youth of many surrounding countries, as far as Cashgar, Yarkend, Camul, Turfan, and some from Kokonor, Amdoa, and China. The course of studies employs twelve years, occupied in logic, astronomy, philosophy, medicine, and, above all, the theology of Boud, or Xaca. In the city of Lassa are many foreign merchants, and the women have been recently polished by their conversation with the Chinese. A beneficial traffic is carried on with Lassa, by exchanging gold dust for silver bullion. N. lat. 30° 30'. E. long. 91° 40'.

LASSAN, or LESSAN, a town of Anterior Pomerania, on a lake formed by the Peene; 38 miles S.S.E. of Stralfund. N. lat. 53° 58'. E. long. 13° 52'.

LASSAY, a town of France, in the department of Mayenne, and chief place of a canton, in the district of Mayenne; 9 miles N.N.E. of Mayenne. The place contains 2976, and the canton 14,258 inhabitants, on a territory of 132½ kilometres, in 14 communes. N. lat. 48° 27'. W. long. 0° 24'.

LASSEUBE, a town of France, in the department of the Lower Pyrenées, and chief place of a canton, in the district of Oleron; 6 miles E. of Oleron. The place contains 2884, and the canton 4974 inhabitants, on a territory of 130 kilometres, in 5 communes.

LASSIELL, a town on the E. coast of the island of Bouro. N. lat. 3° 30'. E. long. 127° 34'.

LASSIGNY, a town of France, in the department of the Oise, and chief place of a canton, in the district of Compiègne; 6 miles W. of Noyon. The place contains 718, and the canton 10,575 inhabitants, on a territory of 135 kilometres, in 24 communes.

LASSIRA, in *Ancient Geography*, a town of Spain, in the Tarragonensis, in the interior of the country of the Edetani. • Ptolemy.

LASSITI, in *Geography*, a town of the island of Candia; 22 miles S.E. of Candia.

LASSITUDE, in *Medicine*, a sense of weariness and debility, independent of fatigue, by which a person is induced to seek for repose and quiescence.

A lassitude is felt in almost all febrile diseases; and in many chronic affections, in which the circulation is feeble and unequal, as in scurvy, chlorosis, &c.; and in disorders of the stomach, liver, and alimentary canal. This feeling of weariness and indisposition to exertion, is indeed often the first and only perceptible symptom of approaching illness, as was remarked by Hippocrates: "Lassitudines spontanea morbos prænuunciant." (Aph. ii. 5.) It is a consequence also of most acute diseases, which leave the strength considerably impaired; and in this case it diminishes in proportion as the system regains its vigour in the progress of convalescence. As it is to be considered only as a symptom of various morbid states of the body, it requires no particular remedies to be specifically adopted for its removal; and the cure of it will be effected by remedying the particular morbid conditions with which it is connected.

LASSONE, JOSEPH MARIA FRANCIS DE, in *Biography*, an eminent French physician, was born at Carpentras, on the 3d of July, 1717. His parents quitted their native province, to procure him the advantages of education afforded by the capital; and the ultimate success of the plan evinced their wisdom and prudence. In his early years, however, young Lassone was not remarkable for his perseverance in study: on the contrary, his family were frequently alarmed by the propensity which he shewed for the gay pleasures of youth; but he as often raised their hopes by some ingenious performances, which merited academic honours, as well as the esteem of his preceptors. He wrote a comedy, which his parents insisted that he should suppress, and sacrifice the imprudent production: he submitted, and was never afterwards willing to declare the title of the piece, which had severtheless been acted with much success, under a different name, and still remains on the theatre. This juvenile work, foreign as it was to his studies, gave an extraordinary proof of the facility and flexibility of his genius, which afterwards enabled him to acquire in the different sciences a just and elevated reputation. Determining upon a strict attention to study, he devoted himself wholly to the pursuits of anatomy, in which he made such rapid progress, that, at the age of twenty-five, he was received into the Academy of Sciences as associate-anatomist. He examined, with great care and perseverance, the structure of the bones, and of the arteries, and demonstrated the muscular coat of the latter. He also investigated the structure, and inquired into the economy and use of the spleen, attempting to reconcile the different accounts given of that viscus by Ruyfch and Malpighi. He had strong hopes of discovering the office of this viscus, when an extraordinary event put a period to his anatomical pursuits. In selecting among some dead bodies a proper subject for dissection, he fancied he perceived in one of them some very doubtful signs of death, and endeavoured to reanimate it: his efforts were for a long time vain; but his first persuasion induced him to persist, and he ultimately succeeded in bringing his patient to life, who proved to be a poor peasant. This circumstance impressed so deep a sense of horror on the mind of the anatomist, reflecting on the consequences of his having selected this unhappy object for dissection, that he declined these pursuits

in future. Natural history succeeded the study of anatomy, and mineralogy became a favourite object of his pursuit: he published his observations on the crystallized free-fluors of Fontainebleau. But chemistry, a science to which he was thus led, finally became the beloved occupation of M. de Laffone. His numerous memoirs, which were read before the Royal Academy of Sciences, presented a valuable train of new observations, useful both to the progress of that study, and to the art of compounding remedies; and in every part of these he evinced the sagacity of an attentive observer, and of an ingenious experimentalist.

M. Laffone, although he had, by the number of his works, given every one reason to suppose that he had devoted himself exclusively to the sciences, had not neglected the practice of medicine. After having exercised it for a long time in the hospitals and cloisters, he was sent for to court; and he was the only example, except the celebrated Fernel, of one individual holding the office of first physician at Versailles, successively to two queens, and afterwards to the king: the ministers and the courtiers had been all changed, but he preserved the friendship of his sovereigns. He lived in friendship with Pontenelle, Winflow, D'Alembert, Buffon, and other scientific characters; and the affability of his manners, and his ardent zeal for the advancement of knowledge, among the young scholars, whose industry he encouraged, and whose reputation was become one of his most satisfactory enjoyments, gained him general respect. When from a natural delicacy of constitution, M. de Laffone began to experience the inconveniences of a premature old age, he became sorrowful and fond of solitude; yet reconciled to his situation, he calmly observed his death approaching, and expired on the 8th of December, 1788. Laffone, at the time of his death, held the appointment of first physician to Louis XVI. and his queen; he was counsellor of state, doctor-regent of the faculty of medicine at Paris, and pensionary-veteran of the academy of sciences, member of the academy of medicine at Madrid, and honorary associate of the college of medicine at Nancy. Hutchinson, Biog. Med. Eloy. Dict. Hist. Mil. de l'Acad. Roy. des Sciences, 1788.

LASSOTH, in *Geography*, a town of Silesia, in the principality of Neisse; 10 miles N. of Neisse.

LASSOUR, a town of Hindoostan, in the circar of Aurungabad; 32 miles N.W. of Aurungabad.

LASSUS, ORLANDUS, or, as he is called by the Italians, Orlando di Lasso, was a native of Mons, in Hainault, born in 1520, and who not only spent many years of his life in Italy, but had his musical education there, having been carried thither surreptitiously, when a child, on account of his fine voice. The historian Thuanus, who has given Orlando a place among the illustrious men of his time, tells us that it was a common practice for young singers to be forced away from their parents, and detained in the service of princes; and that Orlando was carried to Milan, Naples, and Sicily, by Ferdinand Gonzago. Afterwards, when he was grown up, and had probably lost his voice, he went to Rome, where he taught music during two years; at the expiration of which, he travelled through different parts of Italy and France with Julius Cæsar Brancatius, and at length, returning to Flanders, resided many years at Antwerp, till being invited, by the duke of Bavaria, to Munich, he settled at that court, and married. He had afterwards an invitation, accompanied with the promise of great emoluments, from Charles IX., king of France, to take upon him the office of master and director of his band; an honour which he accepted, but was stopped on the road to Paris by the news of that monarch's death. After this event he returned to Mu-

nich, whither he was recalled by William, the son and successor of his patron Albert, to the same office which he had held under his father. Orlando continued at this court till his death, in the year 1593, at upwards of seventy years of age. His reputation was so great, that it was said of him: "Hic ille Orlando Lassus, qui recreat orbem."

As he lived to a considerable age, and never seems to have checked the fertility of his genius by indolence, his compositions exceed, in number, even those of Palestrina. There is a complete catalogue of them in Draudius, amounting to upwards of fifty different works, consisting of masses, magnificantes, passions, motets, and psalms: with Latin, Italian, German, and French songs, printed in Italy, Germany, France, and the Netherlands.

As Orlando di Lasso was the contemporary of Cypriano Rore, a composer of equal renown in the 16th century, and who so much resembled him in genius, abilities, and reputation, we shall here draw a parallel between them, as the two principal masters of Flemish and Netherlandish counterpoint. To form a comparative idea of the style of these two composers, with that of Palestrina, the specific difference seems to be this: that the two Netherlanders, by having spent the chief part of their time in the courts of princes, had acquired a lighter and more secular cast of melody than Palestrina, who, residing constantly at Rome, and writing chiefly for the church, had a natural and characteristic gravity in all his productions. Indeed, the compositions *a capella* of Cyprian Rore and Orlando Lasso are much inferior to those of Palestrina in this particular; for by striving to be grave and solemn, they only become heavy and dull; and what is unaffected dignity in the Roman, is little better than the strut of a dwarf upon stilts in the Netherlanders. They were, however, great masters of harmony, and, out of the church, prepared the colours, and furnished the musician's pallet with many new tints of harmony and modulation, which were of great use to subsequent composers, particularly in dramatic painting.

In the same collection of songs, printed 1555, we have a Latin poem, set by Orlando di Lasso, in the manner of a madrigal, in which the modulation is curious; and though elaborate and *recherché*, it is pleasing, and has had many imitators.

Cyprian and Orlando were the first who hazarded what are now called chromatic passages. At the end of the fourteenth book of songs in four parts, printed at Antwerp by Tylman Sufata, there is an irregular Latin ode by Cypriano, set likewise in the madrigal style, in which not only an A ♯, but an A ♭, appear, for the first time, in the same movement, and almost every accident incident to modern music. Part of this curious composition is inserted in Burney's General History of Music, vol. iii. as a specimen of the author's frequent attempts at new harmonies and modulation, which, as it is laid before the learned musical reader in score, it will afford him much better information concerning the real history and progress of the art of counterpoint at this time, than all the catalogues of books, and descriptions of their contents, which diligence and language could furnish. Many of the forced, crude, and unexpected modulations in the motet of Cyprian Rore, however they may have been admired for their boldness and novelty, were never adopted by subsequent composers. Beautiful, natural, and pleasing passages and effects are soon rendered common by plagiarism and imitation; whereas the unnatural and difficult are long left in the possession of the original proprietor. Perhaps in a series of years, some other composer, unable to astonish by his inventions in a natural way, and determined

to produce something that shall, at least, *seem* new, will propose them again to the public, who will again reject, and so *on, ad infinitum*. But these musical hunters after novelty, without genius to find it, forget that such passages or modulations must have presented themselves to thousands in the course of their studies and *ricercate*, but that good taste and sound judgment had rejected them. It is at all times easy to produce *new* arrangements and combinations of sounds, if nature, grace, and propriety be renounced; but at once to be *new* and *natural*, belongs only to genius of the first order.

The songs in the same collection by Orlando, are said by the publisher to have been composed "à la nouvelle composition d'anciens d'Italie." We find but little melody in any of them, though much modulation, different from the other Flemish masters of this period. There is another essential difference in the notation, as the diminutions into crotchets and quavers, particularly in the songs *alla Napolitana*, are more frequent than in any other compositions of the middle of the 16th century. The chromatic accidental semitones are expressed by a sharp, and no longer left to the mercy and laxity of the finger, as was before the constant custom. The occasional changes in the intervals, which are necessary in counterpoint, though formed upon ecclesiastical melodies, were at first smuggled into harmony, perhaps by fingers whose good ears suggested them, though the composer had not dared to point them out, lest he should be accused of corrupting the modes. Orlando seems the first who, in spite of ancient prejudice and pedantry, when he wished to alter a note, dared to express his intentions in writing. In his more gay and comic style, however, the modulation is overcharged with wanton and unnecessary transitions from one key to another, without remaining long enough in any one to fix it in the hearer's attention.

Of the two compositions by Orlando di Lasso, and Cypriano di Rore, to Latin words, the first is in hexameter and pentameter, and the second an irregular ode, partly in the choral measures of the Greek tragedies. At this mark +, in Orlando's compositions, the first A ✕ occurs that we had ever seen used in counterpoint of equal antiquity; and this seems to have been suggested by the words *novumque melos*. Which of these productions was first composed, we know not, as they were both published together at Antwerp, in 1555. The only copy of this work which we have ever seen, is preserved in the British Museum. The madrigals, in general, of both Cypriano and Orlando, to Italian words, are excellent, in the style of the times. But as the singularities in the two compositions before us seem innovations, and preparatory to that revolution in the art, which takes place soon after, they seemed proper subjects of discussion; for the laboured and equivocal modulation, attempted by these composers, who, though often learned and ingenious, by abandoning the simplicity of their contemporaries, these productions border sometimes so much on caprice and affectation, as to fatigue the attention and offend the ear.

The pedantry of crude harmonies, and learned modulation, only suits depraved ears, that have grown callous to every thing that is easy and natural. The Italians, when they quitted madrigals, and no longer aspired at the applause of fastidious chamber-critics, whose approbation was bestowed on no compositions that did not smelt of the lamp, simplified their secular music, and instead of puzzling and goading the hearer with complicated contrivances and extraneous modulation, aimed at grace and facility in their melodies, which they clothed with such plain and tranquil harmony, as, instead of disguise and suffocation, added greatly to their ener-

gy and effect. Dramatic music was not yet even in idea, and *concerts*, or other assemblies of gay and unlearned hearers, seem now not to have existed; so that musical composers could not be said to write for the public, who will ever prefer such pleasure and amusement as give them the least trouble. Authors of all kinds, who seek for applause, conform to the taste of their judges; and we find, in our own times, that those musicians who are qualified by their genius and abilities, to direct and govern the public opinion, think it necessary, however false and corrupt it may be, to humour and flatter it, by all the concessions in their power. The art never long remains stationary at any one point of cultivation; and if perfection could be attained, its reign would inevitably be short. In music, the learned are few and silent; the ignorant numerous and noisy: in the chamber it was right to please the former, and in the theatre, where

"——— the fair, the gay, the young  
Govern the numbers of each song,"

there is no choice. A public and mixed audience is such a many-headed monster, that all its ears cannot be pleased at the same time; and whether the good or the bad predominate, the greater number must be gratified at the expence of the less.

Two of Orlando di Lasso's sons, Ferdinand and Rodolph, were able musicians, and both in the service of Maximilian, duke of Bavaria; the eldest as chapel-master, and the other as organist to that prince. These collected their father's motets, as well those which had been published during his life, as those which remained unpublished at his decease, and printed them in a very splendid and sumptuous manner at Munich, in seven volumes, large folio, 1604, with a dedication to their patron, the sovereign of Bavaria. The general reception, however, of these compositions, seems not to have equalled the expectations of the editors. Other productions had taken possession of the public ear and favour. It is, we fear, in vain to hope for the revival of old music; too many are interessed in the success of the new; and such are the vicissitudes of what are called taste and expression in this art, that if sufficient probity and zeal could be found in fashionable performers to incline them to attempt doing justice to the productions of former times, it is hardly possible for them to succeed; the accent, energy, and expression are either lost in the execution, or unintelligible to the hearers. There is, indeed, as little chance for a musician of the present age to perform such productions in the manner of the times in which they were composed, as to pronounce a foreign language as well as his own; and if, against all calculation, he should succeed, this music will still be an unknown tongue to the public.

LAST, or LEST, in general, signifies the burden or load of a ship.

LAST is also used for a certain weight and measure, which is various in various countries; though, in the general, the last is estimated at four thousand pounds weight. A last of cod-fish, white herrings, meal, and ashes for soap, is twelve barrels; of corn, or rape-seed, ten quarters; of gunpowder, twenty-four barrels, or two thousand four hundred pounds weight; of red herrings, twelve cades; of hides, twelve dozen; of leather, twelve diekers; of pitch, or tar, fourteen barrels; of wool, twelve facks; of stock-fish, a thousand; of flax, or feathers, one thousand seven hundred pounds weight.

LAST, in the marshes of Kent, a court held by the twenty-four jurors, and summoned by the bailiffs; wherein orders  
are

are made to lay and levy taxes, impose penalties, &c. for the preservation of the said marshes.

**LAST Heir**, is he to whom lands come by escheat, for want of lawful heirs; which, in many cases, is the lord of whom they are held: but in others the king.

**LAST Will**. See **WILL**.

**LAST, Part**. See **POINT-Laff**.

**LASTAGE**, or **LESTAGE**, according to Rastal, is a duty exacted in some fairs and markets, for carrying things bought whither one will.

**LASTAGE**, according to another author, is properly that custom which is paid for wares sold by the laff.

In the law of Richard II. lastage is taken for the ballast, or for lading of a ship. See **BALLAST**.

**LASTAGE** is sometimes also used for garbage, rubbish, or fuch filth.

**LASTEIN**, in *Geography*, a town of Prussia, in the province of Samland; 15 miles S.E. of Ragnitz.

**LASTISANA**, a town of Italy, in Friuli; 7 miles E. of Concordia.

**LASTRES**, a sea-port town and cape of Spain, on the N.E. coast of Asturia; 30 miles N.E. of Oviedo. N. lat. 43° 33'. W. long. 5° 19'.

**LASTRINGE**, a town of Sweden, in Sudermanland; 12 miles N. of Nykoping.

**LASULA**, a small island near the E. coast of Luçon. N. lat. 13° 27'. E. long. 123° 57'.

**LASUS**, in *Biography*, was born at Hermione, a city of Achaia, in the time of Darius Hyftaspes, in the 58th Olympiad, 538 years B. C. Diogenes Laertius says, that he deserves to be ranked among the seven sages. He was generally allowed to be the first among the Greeks who wrote about music, and was not only a theorist and great practitioner, but a dithyrambic poet, perhaps the inventor of that kind of poetry in honour of Bacchus, which was sung in the Phrygian mode at the public games, and partook of all that fire and hilarity which the god to whom it was addressed inspired.

Plutarch says, that he introduced new rhythms in his poetry and dithyrambic music, and upon the lyre, imitated the compass and variety of the flute; for which he is mentioned, in the Dialogue on Music, as a great innovator. Among the corruptions complained of, in the *new* music, the frequent and licentious transitions from one mode and genus to another, was not the least. If the object for multiplying the strings of the lyre, and the holes in the flute, so much complained of by the adherents to the old school, may be supposed to have occasioned the convenience by having an instrument nearly tuned for all the modes, like our harpsichords, it seems probable, that Lasus and other innovators might have been *temperers*, and have accommodated their *doctrine* to their *practice*.

Theon of Smyrna testifies that Lasus, as well as the Pythagorean Hippasus of Metapontus, made use of two vases of the same size and tone, in order to calculate the exact ratio or proportion of concords. For by leaving one of the vases empty, and filling the other half full of water, they became octaves to each other: and filling one a fourth part full, and the other a third, the percussion of the two vessels produced the concords of 4th and 5th; from which process resulted the proportions of these three concords contained in the numbers 1, 2, 3, 4.

This assertion, which has been taken upon trust, like the anvil story of Pythagoras, is equally false: to tune glasses by water has been lately practised, and thought a new discovery; but that their tones are altered in the proportions given above, is by no means true. Most glasses are lowered

about a whole tone, by being half filled with water, and not more than a major 6th if quite filled.

**LATA**, **LIGAMENTA**, in *Anatomy*. See **LIGAMENTUM**.

**LATABI**, in *Geography*, a town of Africa, in the kingdom of Aquamboe.

**LATAC**, or **LADAK**, a town and country of Thibet, forming a kind of detached sovereignty. The town is seven miles N. of the river Lachu, which falls into the Ganges. N. lat. 30° 55'. E. long. 74° 34'.

**LATACUNGA**, a town of South America, and a jurisdiction in the audience of Quito. This jurisdiction is called *Asiento* Latacunga; *asiento* denoting a place less than a town, but larger than a village. This place is situated on a wide plain, having on the E. side the eastern Cordillera of the Andes, from which projects a very high mountain, at a small distance from the foot of which is situated Latacunga, in S. lat. 55° 14'. W. long. 78° 16'; 50 miles S. of Quito. This *asiento* is large and regular; the streets broad and straight; the houses of stone, arched and well contrived; but on account of the dreadful earthquakes to which it is subject, consisting only of one story; one of these happened in June, 1668, and its effect was such, that of 600 stone houses, which the *asiento* then contained, only a part of one, and the church of the Jesuits, were left standing in a damaged state, and most of the inhabitants were buried under their ruins. The stone of which the houses and churches are constructed, is a kind of pumice, or spongy stone, ejected from volcanoes; inexhaustible quarries of it being found in the neighbourhood. This jurisdiction contains seventeen principal villages. The temperature of the air is cold: as this *asiento* is only six leagues distant from the mountain of Cotopaxi, which, not being less in extent and height than those of Chimborazo and Cayamburo, is, like them, covered with ice and snow; but the temperature is very different in the several villages of this jurisdiction; being hot in the vallies, temperate on the plains, and often excessively cold in places bordering on the mountains. The villages are generally larger, and more populous, than those of the other jurisdictions in the same province. Their inhabitants are Indians, Mellizos, and a few Spaniards. The *asiento*, besides a parish church, served by two priests, one for the Spaniards, and the other for the Indians, has convents of Franciscans, Augustines, Dominicans, the Fathers of Mercy, and a college of Jesuits. The inhabitants amount to between ten and twelve thousand, chiefly Spaniards and Mellizos. The Indians live in a separate quarter, as they do at Quito. In this *asiento* all kinds of trades and mechanic arts are carried on; and, as in all the other parts of this jurisdiction, it has a considerable number of manufactories of cloth, bays, and tucnyos. Great quantities of pork are salted here for exportation to Quito, Guayaquil, and Riobamba. The neighbouring country is sowed with clover, and interspersed with plantations of willows, the perpetual verdure of which gives a cheerful aspect to the country. The Indians of Puguli and Saquifili, two villages in this jurisdiction, are noted for making earthenware, as jars, pans, pitchers, &c. which are much valued. The clay of which they are made is of a lively red colour, and emits a sort of fragraney. The workmanship is very neat and ingenious. Juan Ulloa's Voyage to South America, vol. i.

**LATAKIA**, the ancient *Laudicea* (which see), a sea-port town of Syria, in the pachalic of Tripoli, is situated at the base, and on the southern side of a small peninsula, which projects half a league into the sea. Its port, like all the others on the same coast, is a sort of basin, environed by a mole, with a very narrow entrance. It is capable of

containing twenty-five or thirty vessels, but the Turks have suffered it to be choked up, so that it can scarcely admit four. Ships of above 400 tons cannot ride here; and hardly a year passes in which one is not stranded in the entrance. Nevertheless, Latakia carries on a very great commerce, partly of olives, but chiefly of tobacco, of which upwards of twenty cargoes are annually sent to Damietta; the returns from thence are rice, which is bartered in Upper Syria for oils and cottons. In the time of Strabo, instead of tobacco, the exports consisted of its famous wines, the produce of the declivities of its hills. Even then, Egypt was the market by way of Alexandria. Neither Latakia nor Tripoli can be mentioned as places of strength; they have neither cannon nor soldiers: a single privateer would conquer them both. Each of them is supposed to contain from four to five thousand inhabitants; 50 miles S. of Antioch. N. lat. 35° 36'. E. long. 35° 50'. Volney's Travels in Egypt, &c. vol. ii.

LATALATTA, one of the Molucca islands. S. lat. 0° 3'. E. long. 127° 5'.

LATANG, a town of Thibet; nine miles S. of Dsa-prong.

LATANIA, in Botany, a name given by Commerfon to a kind of palm, found in the Ile de Bourbon, and which seems to be barbarously constructed of the French word *late*, a lath, this palm being called in that language *latanier*.—Juss. 39. Lamarck. Dict. v. 3. 427.—Class and order, *Diececa Monadelphica*. Nat. Ord. *Palme*.

Eff. Ch. Male, Spatha of numerous imbricated leaves. Spadix branched, its branches fingered at the top, catkin-like, somewhat cylindrical, of many imbricated single-flowered feales. Corolla in six deep segments; the three outer ones smallest. Stamens 15 or 16; anthers oblong, two-celled. Female unknown.

1. *L. Borbonica*. Lamarck.—Its trunk is straight, simple, cylindrical, leafy at the top. Leaves stalked, fan-shaped, glaucous; their ribs cottony at the back. *Foodstalk* without spines. *Spatha* at the base of the foliage. The flowers are yellow, imbedded in each feale of the catkin. Filaments united at their lower part into a thick column.

LATATSI, in Geography, a mountain of Thibet. N. lat. 31° 35'. E. long. 77° 14'.

LATCHA, a lake of Russia, in the government of Olonetz, about 32 miles long and eight broad. N. lat. 61° to 61° 20'. E. long. 38° 30'.

LATCHETS. See LASKETS.

LATCHOU, or LACHU, in Geography, a river of Thibet, which runs into the Ganges, N. lat. 30° 50'. E. long. 77° 40'.

LATE, a town of Peru, in the jurisdiction of Lima.

LATEEN SAUL, in Sea Language, a long triangular sail extended by a lateen-yard, frequently used by bebecs, polacres, settees, and other vessels navigated in the Mediterranean sea.

LATERAL. See COLLATERAL, MULTILATERAL, and QUADRILATERAL.

LATERAL Equation, in Algebra, denotes a simple equation; an equation whose root is of one dimension.

LATERAL Ligaments, in Anatomy, are those placed at the sides of the joints. See JOINT.

LATERAL Line. See LINE.

LATERAL Operation for the Stone. See LITHOTOMY.

LATERAL Palsy. See PALSY.

LATERAL Sinuses, in Anatomy, the right and left; are the two branches into which the superior longitudinal sinus of the dura mater is divided at the internal transverse ridge of the occipital bone. See VEIN.

LATERALIS MORBUS, a name given by some writers to the pleurisy.

LATERALIS NARIS MUSCULUS, a name given by many authors to that muscle of the face which Albinus has called, from its office, the levator labii superioris alicque nasi. It is also called the obliquus nasi.

LATERALIS RECTUS CAPITIS. See RECTUS.

LATERAN was originally the proper name of a man, whence it descended to an ancient palace in Rome, and to the buildings since erected in its place; particularly a church called St. John of Lateran; which is the principal see of the popedom.

LATERAN, Councils of the, are those held in the basilica of the Lateran: of these there have been five, held in 1123, 1139, 1179, 1215, and 1513.

LATERAN, Canons regular of the Congregation of the, is a congregation of regular canons, whereof that church is the principal place, or seat.

It is pretended there has been an uninterrupted succession of clerks, living in community from the time of the apostles; and that a number of these were established in the Lateran in the time of Constantine. But the canons were not introduced till the time of Leo I. and these held the church eight hundred years, till the reign of Boniface, who took it from them, and placed secular canons in their room: one hundred and fifty years after, the regulars were reinstated.

LATERCULUM, among the Romans, was used for a roll or list of all the magistrates and military officers under the Roman emperors, with an account of their respective offices and fees.

LATERE, A, a Latin term used to denote the qualification of cardinals, whom the pope sends as legates into foreign courts; who are called cardinals *à latere*, as being his holiness's counsellors in ordinary, and assistants. See LEGATE.

The guards of princes were heretofore called *latrones*, because always attending at their sides, *à latere*.

Du Cange, in his Glossary, says there were anciently counts *à latere*, and monitors *à latere*.

LATESA, in Geography, a town of Naples, in Abruzzo Citra; 10 miles S. of Lanciano.

LATEWA, a town of Bengal; 45 miles N.W. of Rangur.

LATEX, in Chemistry, a name by which Van Helmont has, in some of his writings, called the famous menstruum, which he boasts Paracellus and himself to have been possessed of, and which he usually calls *alkebest*.

LATH, in Building, slips of wood used in plastering, tiling, and slating. These are what Festus calls *ambrices*; in other Latin writers they are denominated *templa*; and by Gregory of Tours, *ligaturæ*.

In plastering, the narrower the laths are the better they are for the purpose, so as they are of sufficient breadth to hold the nails, as the number of interstices are increased, the lime or luff will hang more readily, and the thicker they are they will be the better adapted to resist violence; but then they would be much more expensive. The laths are generally made of fir, in three, four, and five feet lengths, but may be reduced to the standard of five feet. Laths are single or double; the latter are generally about three-eighths of an inch thick, and the former barely one quarter, and about an inch broad. Lath is sold in bundles; the three feet are eight score to the bundle, four feet, six score, and the five feet, five score. The lath for plain tiling is the same as that used in plastering. Laths are also distinguished into heart and sap-laths; the former should always be used

in plain tiling, and the latter, of an inferior quality, is most frequently used by the plasterer. Heart-of-oak laths, by the statute Edw. III., should be one inch in breadth, and half an inch in thickness; but now, though their breadth be an inch, their thickness is seldom more than one quarter of an inch; so that two laths, as they are now made, are but equal to one lath. According to the said statute, pan-tile laths are nine or ten feet long, three-quarters of an inch thick, and one and a half inch broad, and should be made of the best yellow deal: the bundle consists of twelve such laths. A square of plain tiling will require a bundle of laths, more or less, according to the pitch. The distance of laying laths, one from another is various, differing more in some places than in others; but three and a half, or four inches, are usual distances, with a counter-lath between rafter and rafter: but if the rafters stand at wide intervals, two counter-laths will be necessary. Laths are employed for various other purposes as well as plastering and tiling, as in filleting for sustaining the ends of boards; in naked flooring and roofing; for furring up the surfaces; and in every kind of small work, where the dimensions of the parts do not exceed the scantling of laths.

In lathing for plastering, it is too frequent a custom to lap the ends of the laths upon each other, where they terminate upon a quarter or batten, in order to prevent cutting them; but though this practice saves a row of nails, it leaves only a quarter of an inch for plaster, and if the laths are very crooked, which they frequently are, there will be no space whatever left to straighten the plaster: the finished surface must, therefore, be rounded, contrary to the intention and to the good effect of the work; but if the ends are to be laid upon each other, they should be thinned at the lapping out to nothing at the extremity, or otherwise they should be cut to exact lengths.

Laths should be as evenly split as possible: those that are very crooked should not be used, or the crooked part should be cut out; and such as have a short concavity on the one side, and a convexity on the other, not very prominent, should be placed with the concave side outwards.

The following is the method of splitting laths: the lathe-cleavers having cut their timber into lengths, they cleave each piece with wedges into eight, twelve, or sixteen pieces, according to the scantling of the timber: the pieces thus cloven are called bolts; then, in the direction of the selvain, with their dowl-ax, into fizes for the breadth of the laths: this operation they call felting; and, lastly, with their chit they cleave them into thickness by the quarter-grain.

**LATH Bricks** are bricks made much longer than the ordinary sort, and used instead of laths for drying malt upon; for which purpose they are extremely convenient, as not being liable to catch fire, and retaining the heat much longer than those made of wood, so that a very small fire is sufficient after they are once heated.

**LATHAM**, in *Geography*, is a township in the parish of Ormskirk, hundred of Well Derby, Lancashire, England, situated 210 miles from London, and containing 434 houses, and 2179 inhabitants. In this township is Latham-house, the seat of Edward Wilbraham Bootle, esq. M. P. This place is noted in the Topographical Annals of Lancashire as the ancient seat of the Lathams in the reign of Edward III., and afterwards of the Stanleys, and lastly, of the Bootles. In the civil wars of the 17th century, Latham-house was heroically and gallantly defended by Charlotte, countess of Derby, who was besieged here by colonels Egerton, Rigby, Ashton, and Holcroft, from the 28th of July, 1644, to the 27th of the following May. This is a memorable instance

of feminine courage and fortitude: a similar example, however, was manifested in Blanch, lady Arundel, at Wardour-castle, in Wiltshire. A particular account of the former is recorded in the "History of the House of Stanley," 8vo. 259; and of the latter in Britton's "Beauties of Wiltshire," 8vo. vol. i. Latham-park is about five miles in circumference, and contains some fine forest scenery. Nearly in the centre is the house, built of stone, after a design of Leoni. In this township is also Cross-hall, once belonging to the earls of Derby, but is now the property of colonel Stanley, M. P. Near it is Blythe-hall, the seat of Thomas Langton, esq. Beauties of England, vol. ix.

**LATHE**, an engine of the most extended application in the mechanic arts, for forming wood or metal into any article of a circular figure. The mode of action in a lathe is essentially different from any other method of cutting, as the work is caused to revolve in a circle, while the tool is held upon a fixed support, and presented to it to cut away any parts projecting beyond the circle described by the motion of the work. To the mechanic the lathe is an invaluable machine, as a very great proportion of all the parts of machines is formed in it, and as it is the only method of working metal which may be considered as perfect. All things which can be turned are made in the lathe, both for accuracy and expedition. The common wooden lathe, in use among wood-turners for making articles of household furniture, is so generally understood, that it is needless to give a minute description of it; we have, therefore, given drawings in *Plate (Lathe)* of a metal lathe, the most perfect of its kind, proper for turning accurate and delicate works. For mathematical instruments, or machinery: it was made by Mr. H. Maudslay, London, who has a great number of different fizes, but on a similar construction, in constant use, at his manufactory for steam-engines, and other machinery, in the Westminster-road. *Figr.* 1. and 2. of the plate are a front and end elevation of the whole lathe, where A is a strong mahogany bench, supported on iron standards B, B, which are shewn fully in *figr.* 2; beyond these are fuits of drawers C, C, to contain the tools, &c.: the standards B carry the axis D of the great foot-wheel E, which gives motion to the work when it is turned by its crank D and treadle F, on which the workman presses his foot, at intervals, to turn the wheel round. The lathe itself, which is fixed upon the bench, consists of a triangular bar G. See also *figr.* 3, which is an enlarged figure of it; it is supported on small standards *a, b, c*, fixed to the bench A by screws going through it: upon this bar the puppets H, I, and K, are fitted with perfect accuracy, and H, which is called the back puppet, can be fastened at any part of the bar by a screw beneath it; the other two puppets, I, K, are screwed down upon the standards *a* and *b*, and are connected together by a piece of metal *d* fitting upon the bar, and call in the same piece with them: these two puppets support the mandrel, or spindle L, one having a screw with a conical steel point to enter a hole in the end of the spindle, and the other having a hard steel collar to receive the neck of the spindle, which fits it with the most perfect accuracy, to turn round freely (by a band encompassing *g* its pulley M), but without any shake in its collar; on the end of the spindle, beyond the collar, is a small screw to fix on the work to be turned. The back puppet H has a hole through the top of it, exactly in a line with the spindle, and a steel pin *e*, with a conical point fitted into it to support the end of a long piece of work; the point is fastened by a screw *g* in the top of the puppet, and has a screw *f* behind it to force it forwards: the bar G, also, has the rest, or support, for the tool fixed upon it, by a piece of metal *g*, (*figr.* 1.) fitted upon

the bar; a slider is fitted upon this piece to slide in a direction perpendicular to the bar, and the same screw beneath fattens the rest upon the bar at any place, and the slider at any length across the bar. On this slider is a socket to receive a pin, on the top of which is a cross-piece, formed like a T, upon which the tool is laid; this T can be adjusted to the height of the work the tool is to be applied to, and can be fattened at any height by the screw in the side of the socket. The various kinds of work to be turned are fattened to the end of the spindle, so as to be turned round with it, by means of what are called chucks: these are pieces of wood, or metal, fitted to screw fast upon the end of the spindle, and a hollow, like a dish, being turned out in it; the piece of wood or metal to be turned is driven into this hollow, and thus held to be turned, by holding a tool over the T of the rest, which is previously fixed close to the work, and presenting the edge to the work as it revolves by the treadle F, turning the foot-wheel, &c.: this, by its band turning the pulley M, and the work with an increased velocity. A chuck of this description is shewn mounted in *fig. 1*, with what is supposed to be a plate of brass, held in it to turn the flat face. Some chucks are flat, with holes through them, and the work is held by screws against it; others are provided with three jaws, like a vice, which can be altogether caufed to advance to, or recede from, the centre, by turning a screw, so as to encompass a piece of work of any dimensions. This method of chucking is adopted to form all kinds of flat or hollow work, as cups, boxes, circular rings, or plates, wheels, &c. which are, therefore, termed chuck-work; but articles of considerable length are supported at both ends, which method is called turning between centres. In this method the puppet H is slid along the bar to the length of the work, and fixed there by its screw: the point *e* is now, by its screw *f*, thrust forwards, and its point enters a small hole, previously drilled in the end of the work: the screw *g* is now tightened, to fasten the point *e*, upon which one end of the work revolves as a centre, the other end is received into a square hole in the end of a chuck screwed to the spindle. In other cases, the spindle has a chuck screwed to it, terminating in a conical point similar to that at *e*; this forms a support for the end, and an arm, projecting from the chuck, intercepts a pin or arm fixed to the work, and by this means turns it round with the spindle. This method of turning between centres is employed to turn spindles of wheels, bolts, serews, rollers, the outfiles of cylinders, or any other articles of greater length than their diameter. When a piece of work is to be turned, which is larger than the lathe will admit, the bar is to be drawn out, as in *fig. 1*, and supported by an additional standard *c* screwed to the bench. In the same state it will admit longer work.

The particular manner of holding the tool to the work is not easy to describe in words, but is soon acquired by practice. The tools for brass are square or flat bars of steel, the ends of which are cut off obliquely, to form an edge like a chisel, but with a very obtuse angle. It is held in such a position, that its upper flat surface points to the centre of the work to be turned: it is to be held down as firmly as possible to the rest, and advanced to the work at intervals, whenever it ceases to cut, by having removed all the projections of the work without the circle it describes. For turning with extreme accuracy, the slide-rest is a very useful addition to the lathe. It is a rest with two sliders in different directions, to one of which the tool is fixed; by means of screws with handles, the sliders and the tool can be moved in either direction, to bring the tool to the work. *Figs. 3, 4, and 5*, explain the ingenious piece of mechanism. N A

is a piece of metal, fitted to the bar of the lathe, and provided with a serew to fasten it at any place: upon the upper surface, which is flat, two pieces of brass are screwed, to form a dove-tailed groove, in which a slider, *b*, is fitted, to move with freedom and precision; a screw, *i*, is mounted in the frame N, and is lapped into a piece projecting from the lower side of the slider, so that the serew, when turned round by a handle fitted on its square, advances or draws back the slider in its groove. Upon this slider, *b*, is a frame *k*, having at the top of it a slider *l*, provided with a serew *m*, as the former, to move it, and carrying a piece *n*, with square holes through it in two directions to receive the tool *o*, and a serew at top to fasten it in. The slide-rest being mounted, in the manner of *fig. 3*, upon the bar, the upper slider, *l*, is parallel with the spindle, and the lower one, *b*, perpendicular thereto. For turning flat work, the tool is put in as there shewn: now by turning the serew, *m*, of the upper slider, the tool is advanced in contact with the work, which is mounted as in *fig. 1*; then by the other serew, *i*, it is drawn across the face of the work, turning it as it proceeds, to a perfectly flat surface. For turning a cylinder between centres, the tool, *o*, is put through its holder *n*, in a direction perpendicular to that shewn in *fig. 3*; and then the lower slider, *b*, is moved to adjust the tool to the diameter of the intended work; and the upper slider is moved, to carry the tool along the length of the cylinder, and cut it as it goes. The slide-rest will also turn cones, by the following contrivance: the frame *k*, supporting the upper slider, is fitted to the lower slider by one pin, upon which the whole frame and upper slider may be turned round and fattened at any inclination, by two serews passing through circular grooves. By this means the upper slider is inclined in any angle to the spindle, to turn a cone either hollow or solid, as the tool is put into its holder in one or other direction.

The slide-rest can be made to cut serews by an ingenious application, which is explained in *figs. 6 and 7*. A short bar P, exactly of the same dimensions as the large one, is fitted thereon, and fattened by its serew *p*. Upon this the slide-rest is placed: its sliders now stand in a direction perpendicular to what they did before, though on the same level. The serew to be cut, represented by Q, *fig. 6*, is mounted between the centres, and turned to a true cylinder by a tool put in the holder *n*, and carried along parallel to the spindle, by turning the serew, *i*, of the lower slider: this being done, a cog-wheel, V, is fitted on the chuck, at the end of the spindle, and another, W, is attached to the end of the serew, *i*, of the lower slider, so that it will be turned round at the same time with the spindle. A tool, with a point of the proper form to cut the thread of the serew, is put in the holder *n*, and advanced by the serew, *m*, of the upper slider to touch the cylinder Q. The lathe being now put in motion, the tool is moved along by the serew of the lower slider, at the same time the work revolves, and upon which it traces a spiral groove. When it arrives at the end of the serew, which it only scratches the first time, the tool is drawn back clear of the work, and the lathe turned the contrary way, to return the tool to the place where it first set out. The tool is then set by the serew *m*, to cut deeper than the first time, and the serew is cut over again: this being repeated four or five times, the serew is completed. By this method a serew of any degree of fineness may be cut, by merely changing the proportion of the cog-wheels, V, W, which connect the spindle and the serew of the lower slider. It is plain, if these wheels are of equal size, a serew will be formed of the same width of threads as the serew of the slide-rest at *i*; and if the wheel, W, on the serew, is the largest,

largest, the screw cut will be finer; if, on the other hand, the smallest wheel is fixed on the screw at W, it will cut a screw of a coarser thread than the screw *i*. The lathe is provided with wheels of all the different sizes, shewn by the dotted circles V, *fig. 7*, any of which may be fixed on at pleasure, either on the screw or the chuck. The screw cut in this manner will have its threads inclined in a contrary direction to the screw of the slide-rest; and if that is a left-handed screw, it will cut a right-handed screw, because the slider-screw revolves in an opposite direction to the spindle. That the lathe may cut screws of either kind, an intermediate cog-wheel is introduced between the two, to cause them to turn the same way. This gives another advantage, *viz.* that any two wheels may be used together; the intermediate wheel communicating motion from one to the other, though they are considerably distant from touching each other. The application of the intermediate wheels is explained in *figs. 8* and *9*, where *r* is a projecting shelf from the standard *a*; upon this a piece of metal, *x*, is fastened by a screw, and a short hollow spindle, *v*, is fitted into it, and fastened by proper screw-collars which admit its rotation; upon the end of this the cog-wheel W, which turns the screw of the slide-rest, is fastened by a nut: an arm, *co*, is fitted on the short spindle *v*, so as to have an angular motion round the centre: the arm has a groove in its length, in any part of which the centre pin of the intermediate wheel, *x*, can be fastened; and by these two motions this wheel may be fixed at any joint, so as to connect the wheels of any size. The hollow spindle, *v*, is adapted to receive an arbor or axis *y*, which has a socket in the end adapted to the square, upon the end of the slide-rest screw *i*: by this method the slide-rest may be set at any part of the lathe bar; when it is required to cut a screw at the end of a long bolt; the arbor *y*, forming the connection between the cog-wheel, W, and the screw, for which purpose it slides through the hollow spindle *v*, but is caused to revolve with it, by a feather or fillet projecting from one side; the socket of the hollow spindle may be set and fastened at any required distance from the lathe bar, and fastened by its screw; the slide-rest being set at a correspondent distance from the spindle of the lathe, by moving it upon the bar P, will admit a large piece of work, when a screw is required to be cut upon it. R, *fig. 7*, is an iron frame, fastened to the lower slider of the slide-rest, to support the screw from bending by the pressure of the tool, when it is long and slender. The frame is shewn in plan in *fig. 10*, where the holes are shewn for the two screws which hold down the frame upon the lower slider.

The methods of holding various pieces of work in the lathes to turn them are endless, and depending in a great measure upon the ingenuity of the workman to adapt them to the particular occasions he meets with. This subject, as well as the figure and manner of holding the tools, will be resumed under the article TUNING; an art which, from the facility with which it produces so many beautiful forms, has become a fashionable amusement among gentlemen, who may require many practical instructions, which would be needless to the mechanic regularly educated in the workshop. We shall also describe the method of turning elliptic work, as well as circular.

LATHIE, in *Lavo*. See LETTIE and LATIREVE.

LATHE, in *Rural Economy*, a provincial term used in some countries to signify a barn.

LATHRÆA, in *Botany*, (*λάρυξ*), *clandestina* or *concealed*, because the herbage is mostly under the ground, or at least covered with dead leaves of trees.) Toothwort. Linn. Gen. 375. Schreb. 402. Willd. Sp. Pl. v. 3. 200. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 654. Juss. 102. La-

marck Illustr. t. 551. Gærtn. t. 52.—Class and order, *Didymia Angiosperma*. Nat. Ord. *Personata*, Linn. *Pedicularæ*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, bell-shaped, erect; its orifice deeply four-cleft. Cor. of one petal, ringent; tube longer than the calyx; limb ringent, swelling; its upper lip concave, helmet-like, broad, with a narrow hooked point; lower lip smallest, reflexed, obtuse, mostly three-cleft. Nectary a very short notched gland, depressed on both sides, inserted into the receptacle of the flower at one edge of the germen. Stam. Filaments four, awl-shaped, the length of the corolla, and concealed under its upper lip, two rather shorter than the rest; anthers oblong, two-lobed, barbed, flattened, cohering in pairs. Pist. Germen superior, globose, slightly compressed; style thread-shaped, of the length and situation of the filaments; stigma tumid, abrupt, drooping. Peric. Capsule roundish, obtuse with a point, invelled with the enlarged spreading calyx, of one cell and two elastic valves, each bearing a central, longitudinal, fungous receptacle. Seeds few, nearly globular, inserted into the receptacles.

Obf. The nectariferous gland shews its very near affinity to *Orobanchæ*. Linn.

Ess. Ch. Calyx four-cleft, inferior. A depressed gland at the base of the future of the germen. Capsule of one cell, with lateral fungous receptacles. Seeds globose.

1. *L. Clandestina*. Subterraneous Toothwort. Linn. Sp. Pl. 843. Lamarck, *fig. 1*. (*Clandellina flore subcæruleo*; Tourn. Inst. 652. t. 424. *Orobanche, five Dentaria aphyllæ purpureæ, cespitæ densæ*; Morif. Sect. 12. t. 16. f. 15.)—Stem branched, subterraneous. Flowers erect, solitary.—Native of shady woods in France, Italy, and the Pyrenees, growing parasitically on the roots of trees. The stem is subterraneous, at first short, and densely clothed with crowded, sessile, rounded, convex, very fleshy, entire, whitish leaves. In this stage of the plant the flowers rise above the ground, and are at first nearly sessile, very large, the corolla being two inches long, of a blueish colour, sometimes white, and they grow in rather close tufts. Afterwards the stem is greatly elongated, the leaves become remote, and shrivelled, the corolla falls, and each calyx is elevated on its own separate simple stalk above an inch long. This latter state is represented in Rudbeck's Elys. p. 229. f. 2. As we find no correct account of the growth of this singular plant, the above may not be unacceptable. It seems to shew the herb, if not the root, to be but of annual duration. What have been called scales of the root in this genus, seem equivalent to leaves, and we have fo denominated them above.

2. *L. Anblatum*. Oriental Toothwort. Linn. Sp. Pl. 844. (*Anblatum orientale, flore purpurascente*; Tourn. Cor. 48. t. 491.)—Lips of the corolla undivided.—Found by Tournefort in the Levant. Linnæus has taken up this species entirely from the plate and short definition of the great French botanist. It should appear to be most akin to the following, with which it constitutes Tournefort's genus of *Anblatum*, whose name is of German etymology, and adopted from Valerius Cordus.

3. *L. Squamaria*. Greater Toothwort. Linn. Sp. Pl. 844. Fl. Dan. t. 136. Engl. Bot. t. 50. (*Squamaria*; Rivin. Monop. Irr. t. 89. f. 2. *Dentaria major Matthioli*; Ger. em. 1585.)—Flowers racemose, pendulous. Lower lip three-cleft.—Native of shady woods throughout Europe, flowering in March or April, and growing parasitically on the roots of the hazel, for the most part. The subterraneous portion of the stem is branched, clothed with fleshy-white leaves, as in the first species; what rises above-ground is simple, purple, downy, racemose, bearing numerous drooping purple flowers, with a pale calyx, each partial flower

stalk attended by a leaf like those that grow below the surface.

LATHRÆA *Phelypæa*. See OROBANCHE.

LATHREVE, LEIDGREVE, or *Trithingreve*, was an officer under the Saxon government, who had authority over a third part of the county; and whose territory was therefore called trithing, otherwise a leid, leithin, or lathe, in which manner the county of Kent is still divided; and the rapes in Suffex seem to answer to the same. As to the jurisdiction of this officer, those matters that could not be determined in the hundred court, were thence brought to the trithing; where all the principal men of the three or more hundreds being assembled by the lathreve, or trithingreve, did debate and decide it: or if they could not, then the lathreve sent it up to the county court, to be there finally determined.

LATHRUS, in *Entomology*. See SCARABÆUS.

LATHYRIS, in *Botany*, a name given by many authors to a species of tithymal, or spurge, commonly known by the name of *tithymalus latifolius*, the broad-leaved spurge, and called by some also *cataputia*.

LATHYRUS, a name adopted from Theophrastus, whose *λαβυρος* appears evidently to be, like ours, something of the pea or vetch kind, though it is impossible precisely to determine what.—Linn. Gen. 375. Schreb. 497. Willd. Sp. Pl. v. 3. 1077. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 763. Juss. 359. Lamarck. Illustr. t. 632. Gærtn. t. 152.—Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. Perianth inferior, of one leaf, bell-shaped; its segments lanceolate, acute; the two uppermost shortest, the lower one longest. *Cor.* papilionaceous. Standard very large, inversely heart-shaped, reflexed at the sides and summit. Wings smaller, oblong, somewhat crescent-shaped, short and obtuse. Keel semicircular, the size of the wings but broader, separating about the middle inwards. *Stam.* Filaments in two sets, one simple the other in nine divisions, curved upwards; anthers roundish. *Pist.* Germen compressed, oblong, linear; style in its upper part erect, flat, broader upwards, acute at the summit; stigma on the upper or inflexed side of the style, extending from the middle to the top, hairy. *Peric.* Legume very long, cylindrical or compressed, pointed, of two valves and one cell. *Seeds* several, either cylindrical, globose, or slightly angular.

Eff. Ch. Style flattened, downy above, broader upwards. Two upper segments of the calyx shortest.

Tournefort divides this genus into four by the foliage. His *Lathyrus*, t. 216, 217, has only a single pair of leaflets on each footstalk, the latter terminating in a compound tendril; his *Clymenium*, t. 218, has many leaflets to each stalk; his *Nissolia*, Inl. 656, has simple leaves without any tendril; and his *Alphaca*, t. 223, bears stipulas without leaves, at least in the adult plant. These, however, are very justly deemed by Linnæus mere differences in habit, among the species of one great genus, which is on the whole sufficiently natural. His 14th edition of Syst. Veg. enumerates 21 species, Willdenow 36, in three sections. The first section, with single-flowered stalks, now and then varying to two flowers, embraces 13 species; the second, with two-flowered stalks, has six; the third, with many flowers on each stalk, has 17.—Seven of the genus only are natives of Britain. The rest grow either in the warmer countries of Europe, or in the north of Africa, some in America, and one it is said in Japan. They are stationed for the most part in cultivated fields, in meadows, or about hedges and thickets. Those referable to the first and second sections are, perhaps

without exception, always annual plants, many of them capable of being used as pulse; those of the third are generally perennial, with very tenacious, deep or creeping roots, and more calculated for fodder. Examples are here subjoined.

\* *Stalks single-flowered.*

*L. Alphaca*. Linn. Sp. Pl. 1020. Curt. Lond. fasc. 5. t. 51. Engl. Bot. t. 1167. (Alphaca; Raii Syn. 320, Ger. em. 1250.)—Flowers solitary. Tendrils leafless. Stipulas between heart and arrow-shaped.—Found in the borders of gravelly corn-fields, but rarely. The *stem* is weak, a foot or two high, supported by its numerous simple tendrils, each springing from between two large, angular, almost halbert-shaped *stipulas*, which give the plant a peculiar aspect. One or two of the very first stipulas only are accompanied by a pair of small leaflets, with or without any elongated tendril. The *flowers* are small and yellow, very rarely two together on each flower-stalk.

*L. arabicarpus*. Linn. Sp. Pl. 1029. (L. minimus penennis  $\alpha\mu\alpha\rho\alpha\rho\omega\tau\omega\varsigma$ , seu supra infragie terram siliquas gerens; Morif. Sect. 2. Append. t. 23. f. 1.)—Stalks single-flowered, longer than the calyx. Tendrils two-leaved, quite simple.—Native of Syria. A humble plant, remarkable for producing many of its pods, with perfect seed, immediately from the root, or rather from the subterraneous part of the stem; yet these are the offspring of perfect flowers, (at least as to stamens and pistil,) though born under ground; as we have verified by examining the plant in Kew garden 30 years ago. Whether the roots be annual or perennial, we are not certain, but this subterraneous mode of fructifying is seen in two or three more species of *Lathyrus* or *Vicia*. Morison's figure exhibits the present plant very tolerably. What rises above ground bears linear-lanceolate rather glaucous leaflets, in pairs, with half arrow-shaped *stipulas*, and a dull solitary dull-purple *flowers*, which also produce feed.

*L. articulatus*. Linn. Sp. Pl. 1031. Curt. Mag. t. 253.—Stalks with one or two flowers. Tendrils accompanied by many alternate lanceolate leaflets, on a winged stalk.—Native of France and Italy. A common hardy annual in our gardens, to a place in which it is recommended by its elegant though scentless *flowers*, whose crimson standard is prettily contrasted with their white wings.

\*\* *Stalks two-flowered.*

*L. obovatus*. Common Sweet Pea.—Linn. Sp. Pl. 1032. Curt. Mag. t. 60.—Stalks two-flowered. Leaflets ovate-oblong, two to each branched tendril. Legumes hairy.—Native of Sicily, and some say of Ceylon; but the latter may perhaps be doubted, the plant being in the English gardens so hardy an annual, as frequently to survive our winters, when it comes up in autumn. Its great beauty, delicious fragrance, and variety of colours, render it a general favourite. More than two flowers are frequent on each stalk, though the uppermost are commonly blighted.

\*\*\* *Stalks many-flowered.*

*L. tuberosus*. Linn. Sp. Pl. 1033. Curt. Mag. t. 111.—Stalks many-flowered. Leaflets oval, in pairs. Stem without wings. Roots tuberous.—A troublesome weed in some parts of Germany and Italy, spreading widely over all kinds of cultivated ground, by means of its tuberous fleshy perennial roots, hardly to be extirpated. In our gardens it is a beautiful hardy plant, conspicuous for the peculiarly delicate rose-colour of its *blossoms*, and we have never heard of its being troublesome in its increase. The *seeds* rarely

rarely ripen. The *knobs* of the root are eatable when boiled.

*L. latifolius*. The Great Everlasting Pea. Linn. Sp. Pl. 1033. Engl. Bot. t. 1108. Mill. Illustr. t. 62.—Stalks many-flowered. Leaves elliptical, in pairs. Stem winged.—Very commonly cultivated in gardens, where its roots endure for a long course of years, throwing up tall climbing *stems*, which bear large bunches of beautiful crimson *flowers*, well known to most people. We rather doubt whether the plant be truly wild in England, yet it appears in some places to be so, and finds a place in all our British Floras.

*L. sylvestris*. Narrow-leaved Everlasting Pea. Linn. Sp. Pl. 1033. Engl. Bot. t. 805. Curt. Lond. fasc. 6. t. 52.—Differing from the last in the narrowness of its *leaves*, and less gaudy hues of its *flowers*, is perhaps a more elegant plant, and certainly wild in many parts of England in low bushy spots.

LATHYRUS, in *Gardening*, contains plants of the herbaceous climbing flowery kinds, of which the species chiefly cultivated are the sweet lathyrus, or pea, *L. odoratus*; the tangier lathyrus, or pea, *L. tingitanus*; and the broad-leaved lathyrus, or everlasting pea, *L. latifolius*.

But several other species may be cultivated where variety is wanted.

The first of these sorts has several varieties; as the purple-flowered, the white-flowered, the variegated or painted lady, sweet-scented, and the scarlet.

The second sort is a showy plant for shrubberies, wilderness quarters, arbours, and trellis-work; but too large and rampant for borders of the common flower-garden.

It has many varieties; as the red-flowered, the purple-flowered, the scarlet-flowered, and the large-flowered.

*Method of Culture*.—These plants may be readily raised, by sowing the seeds of the different sorts in the autumn or spring seasons, at different times in patches of six or eight together, in the places where they are to grow. Where the soil is light and dry, the autumn is the best season, as the plants appear more early, but in other cases the spring should be preferred. The plants afterwards only require to be kept clean from weeds, and be properly supported by branchy sticks.

The last sort may likewise be increased by transplanting the roots in the autumn; but the plants in this way are seldom so good as by seeds.

And the two first sorts must be sown annually, but the last will remain many years.

It may be noticed that it is the practice with the gardeners who raise the first sorts for the London markets, to sow them in the autumn in pots, and secure them from severe weather, by placing them in hot-bed frames: by which means they can bring them much more early to market. They may be continued in flower the whole of the summer by repeated sowings in the spring. When sown in pots, they should be watered frequently in a slight manner.

All these plants are highly ornamental in the borders, clumps, and other parts of pleasure-grounds, when properly intermixed in their species and different varieties in such compartments.

LATIANO, in *Geography*, a town of Naples, in the province of Otranto; five miles E. of Oria.

LATIAI, a feast or ceremony, instituted by Tarquinus Superbus, in honour of Jupiter Latiaris, or Latialis.

Proposed, having made a treaty of alliance with the Latins, to perpetuate it, to erect a common temple, where all the allies, the Romans, Latins, Hernici,

Volsci, &c. should assemble themselves every year, hold a kind of fair, exchange merchandizes, feast, sacrifice, and make merry together. Such was the institution of the Latian. The founder only appointed one day for this feast; the first consul added another to it, upon concluding the peace with the Latins; and a third was added, after the people who had retired to the Mons Sacer were returned to Rome; and a fourth, after appealing the sedition raised on occasion of the plebeians aspiring to the consulate.

These four days were called the *Latin feriae*; and all things done during the course of the *feriae*, as feasts, sacrifices, offerings, &c. were called *Latiare*.

LATICLAVIUM, or LATUS-CLAVUS, a garment which was a distinction and dignity among the Romans, contradistinguished from the angusticlavium.

The lati-clavium was a kind of tunic or long coat, faced with one or two slips of purple, applied lengthwise to the two sides of the tunic.

In the latus-clavus these slips were pretty broad, and in the angustus-clavus narrower; though there is nothing about which the learned differ more than the difference between those two habits.

There were buttons set on the latus-clavus, which appeared like the heads of large nails; whence some think it took its name.

The senators, prætors, and the chief magistrates of colonies and municipal cities, had a right to wear it. The robe called prætexta was worn over the latus-clavus. When the prætor pronounced sentence of death, he put off the prætexta; but retained the latus-clavus.

LATICZOW, in *Geography*, a town of Poland, in the palatinate of Braclaw; 60 miles N.W. of Braclaw.

LATILLA GAETANO, in *Biography*, an excellent Neapolitan composer, much esteemed by connoisseurs, in every species of vocal music. His comic operas, however, were the most ingenious and successful of all burletta compositions, till the Buona Figliuola of his nephew Piccini came out, which surpassed all preceding comic operas so much, that no other excited any curiosity in the public; till Pacifiello's superior fertility was known and felt.

Latilla's comic operas, that were performed in London, from 1748 to 1753, when the Mingotti first arrived, were "La Comedia in Comedia," "Orazio," and "Don Calafino," which were admirable. The melodies new, easy, and pleasing; humour without buffoonery; and the actors considered as well as the singers, in allowing time for Pertici and Laschi, those nice observers of whatever was ridiculous in the voice, countenance, or gesture of man, to convey their observations to the spectators.

We met with poor Latilla 20 years afterwards at Venice, "fallen from his high estate," and shrunk into an humble deputy organist, at the church of St. Maca; but found him an intelligent and well informed man, on other subjects than that of his own profession, which, however, he had cultivated in all its departments.

LATIMER, HUGH, the son of a respectable Leicestershire yeoman, was born about the year 1470. He was initiated in school learning in the country, and making a very rapid progress in his youthful studies, he was, at the age of fourteen, sent to Christ's college, Cambridge, where he was distinguished for his rapid proficiency in the studies of the place. Here he took his degrees, entered upon holy orders, and was at this period a zealous Papist, read the scriptures and the schoolmen with the same reverence, and held Thomas à Becket and the apostles in equal honour. He had taken alarm at the progress of Lutheranism, and inveighed with great bitterness, publicly and privately, against those principles,

ciples, of which he was hereafter to become a most zealous defender. His zeal as a Papist was so distinguished in the university, that he was elected cross-bearer in all public processions, an employment which he is said to have accepted with a high degree of reverence, and to have discharged with much solemnity. Our good divine was a Papist from conviction, and had a mind open to arguments on all sides of the question; he fortunately met with Mr. Thomas Bilney, a clergyman of great piety, and who, by the perusal of Luther's works, had become a secret favourer of the reformation. By degrees he infused into the mind of Latimer all those doubts which he had formerly felt respecting the discordance of Popery with pure Christianity. Latimer heard the arguments of his friend, and was prepared at first to dispute the ground inch by inch. At length he found the ground on which he stood absolutely untenable; and acknowledged the errors in which he had been educated. But the temper of the scholar was not like that of the matter: he could not be a Protestant in secret: he must come forth boldly and declare the convictions of his heart: he had fought truth as the pearl of great price, and having, as he believed, found it, was determined not to conceal its beauty from his friends and the world. He became an active apostle in the cause of Protestantism; he preached in public, he exhorted in private, and every where enforced the necessity of a holy life, in opposition to the superstitious ceremonies and observances inculcated by the Romish religion. He soon became obnoxious to the generality of the clergy, but being contented to go through evil as well as good report, he continued on his course with more ardour in proportion to the outcry made against him. He inveighed against the ceremonies which encumbered true religion, and exposed the pride and usurpation of the Romish hierarchy: but what he most insisted on was the right of the people to read the Scriptures in their native tongue. Dr. Buckenham, one of the Black-friars, was selected to answer, from the pulpit, the arguments of Latimer: he performed the task with great pomp, but not to the complete satisfaction even of his own party, and in a short time afterwards the whole university met to hear what the reformer had to say in his defence. Mr. Latimer at first recapitulated Dr. Buckenham's arguments; placed them in the strongest light, and gave them much greater importance than the friar had been able to do: he then attacked them with so much force of reasoning, and such abundance of wit, as to render the learned doctor truly ridiculous: he next appealed to his hearers, urging them to respect their own understandings, and not to submit to be led by the priests, who had ever been accustomed to treat the people at large with contempt; and he concluded with ardently hoping, that his honest countrymen might be permitted to have the use of the scriptures, till they shewed themselves to be as absurd interpreters of them as the learned friar. Latimer, by this exertion, and by an answer to Venetus, greatly increased the credit of the Protestant party at Cambridge. Bilney and Latimer were regarded as the heads of the party, and to them the students looked with respect, attachment, and even veneration. The heads of the colleges, and the senior members of the university, were alarmed, and determined to withstand the progress of heresy. Frequent convocations were held, and the strictest injunctions were laid on all the tutors to be watchful of the opinions of their pupils; but these efforts were in vain, and the bishop of Ely was applied to, and entreated to crush, by his authority, the new opinions. The prelate, though a Papist, was not a true perfectionist: he was willing to judge for himself, and though he went to Cambridge and preached against the heretics, yet he did not scruple to attend himself

the sermons of Latimer, and with much candour declared, that the reformer was the best preacher he had ever heard. Latimer's enemies next appealed to the court, and transmitted very heavy complaints respecting the increase of heresy; and Wölsey, contrary, it is thought, to his own inclination, instituted a court, consisting of bishops and other divines, to put the laws in execution against heresy. Bilney and Latimer were called to answer for their conduct, and as the former was regarded as the most guilty, by being the first promulgator of the new doctrines, his examination was the most severe, and he was pronounced guilty; but not having a mind formed for the sufferings prepared for him, he recanted, and after some ignominious treatment was dismissed. Latimer, and others who were involved in the charge, were, by the management of the cardinal, and the merciful disposition of Tunstall, bishop of London, dismissed probably without a reproach: the cardinal even granted Latimer his licence to preach throughout England. The friends of the reformers received them with open arms; but the fate of Bilney was truly wretched; he was struck with remorse at the thought of his recantation, and the agonies of his mind deprived him for a time of his reason. In a few years he returned to a sane state, and determined to expiate his abjuration by his death. He accordingly left his friends at Cambridge, went into Norfolk, his native country, and preached most earnestly against the corruptions of the established religion; he was seized, imprisoned, and executed, at Norwich, exhibiting, at his closing scene, a most admirable example of composure, firmness, and Christian courage. Latimer, in the mean time, exerted himself more than ever: he was constant in his exertions, and once or twice he had the honour to preach before the king at Windsor. Encouraged by the gracious reception afforded him by Henry, he took the liberty of writing a very bold letter to his majesty, against a proclamation which the clergy had prevailed upon the king to publish, forbidding the use of the bible in English. The king received the letter with good temper, and even thanked Mr. Latimer for his well-meant advice. When measures were taken for the establishment of the king's supremacy, Latimer exerted all his powers in forwarding his majesty's designs. His zeal in the business procured for him the presentation of the rectory of Westkinton, in Wiltshire, and, notwithstanding the remonstrances of his friends, who considered this as the first step only to higher dignities in the church, he went to reside on his living. His preaching rendered him very popular, and he was soon after appointed by the mayor of Bristol to preach on Easter Sunday. Public notice of this appointment had been given, and received by the people with great joy; but an order was suddenly issued by the bishop of Bristol, prohibiting any one to preach there without his licence. This was but the first instance of opposition which the clergy in that neighbourhood excited against him; they traduced his character, and inveighed against him with the greatest violence; and at length they drew up a set of articles, in the form of an accusation, which was laid before Stokesley, bishop of London, who immediately cited Latimer to appear before him. To this mandate he was not obedient, but on a citation from the archbishop he instantly submitted. He set out in the midst of winter, and at a moment when he was grievously afflicted with the stone and other acute disorders. On his arrival in London he found the court sitting, but instead of being examined as to any particular charges, he was ordered to subscribe a paper put into his hand, containing the obnoxious doctrines against which he had been preaching. This he positively refused, and he was dismissed, for the present, with an exhortation to reflect upon his conduct, and submit.

Frequently was he brought before the court, and as frequently he rejected the proposal. At length he remonstrated against their ill-treatment, and was probably refused by the interposition of the king. In 1534, he was appointed chaplain to queen Anne Boleyn, and in the following year he was offered the bishopric of Worcester, which he accepted, and discharged the duties of the office with zeal, piety, and diligence. In 1536, he was called on to attend the parliament and convocation; and it was hoped that this session would bring with it many important advantages for the Protestant cause. The convocation was opened by an eloquent Latin discourse from Latimer, who had been appointed to this office on account of his great talents, and because it was known that no other person could so ably expose the corruptions of the clergy as himself, and thus lead them to an active discharge of their duty. In a short time after this, an English translation of the bible was published and recommended by authority to a general perusal. During the sitting of the convocation, an animated but unsuccessful attempt was made to stigmatize archbishop Cranmer and bishop Latimer, by some public censure. As soon as the convocation broke up the bishop repaired to his diocese; he had no taste for state affairs, and he had a mind ill adapted to the manners of a court. It was the custom at that period for the bishops, at the commencement of every new year, to make presents to the sovereign, and many of them were very liberal in their donations; but Latimer, on this occasion, presented, instead of a purse of gold, a New Testament, with a leaf doubled down on this passage, "Whoremongers and adulterers God will judge."

Attempts were frequently made to ruin the bishop, but hitherto they were unsuccessful; and he continued in favour with the king. After the passing of the bloody statute, or the act of the six articles, the bishop protested against it by his conduct; he resigned his bishopric, and retired into the country. Here he intended to pass the remainder of his days, but an accident, which befel him, by the fall of a tree, obliged him to come to London for surgical assistance. His arrival was soon known in the metropolis, and the spies of the bloody-minded Gardiner watched him in every place. At length they obtained, or made, matter for accusation; he was charged with speaking against the statute of the six articles, and was, without hesitation, committed to the Tower, where he suffered a cruel imprisonment during the remainder of king Henry's reign. On the accession of Edward VI. Latimer, and all the others who had been imprisoned in the same cause, were set at liberty. He might have been reinstated in his bishopric, but he preferred a more private life, accepted an invitation from Cranmer, and took up his residence at Lambeth, where his chief employment was to hear the complaints, and to procure redress for the injuries, of poor people. No man was so well qualified for an office of this kind, and he continued in it during two years, interfering very little with public transactions. It was, however, known that he assisted the archbishop in composing the Homilies, which were published, by authority, in the beginning of king Edward's reign, and intended to supply the want of preaching, which was now at a very low ebb. Being one of the most eloquent preachers of the age, he was appointed to preach the Lent sermons before the king, during the first three years of his reign. After this he retired into the country, and made use of his majesty's licence, as a general preacher, in those parts where he thought his labours might be most serviceable. He continued in this practice till Popery was re-established in the reign of queen Mary, when he was cited to appear before the council in London. He immediately obeyed, and as he passed through

Smithfield, the scene of the most horrid cruelties exercised upon those who had been denominated heretics, he said, very cheerfully, to his attendants, "this place has long groaned for me." The next day he appeared before the council, who, after loading him with many reproaches, committed him to the Tower. His imprisonment was rendered uncommonly severe, but he endured every evil with resignation, and true Christian humility. The weather was exceedingly severe, but no fire was allowed him, which led him to tell the lieutenant of the Tower, that, however his enemies might expect he should be burned, unless he was permitted to have a fire this frosty weather, he should be first starved to death with cold. About this time archbishop Cranmer and bishop Ridley were committed to the Tower, which became so crowded with prisoners, that the three prelates were confined in the same room, a circumstance which, no doubt, they greatly enjoyed. The pleasure, however, was but of short duration; they were hurried to Oxford under the pretence of a public disputation to be held there by the most eminent divines on both sides. At this place they were most closely confined in the common prison, and deprived of every comfort, and of almost all the necessaries of life; hence they readily inferred what kind of disputation would be allowed them. They fully expected that the argument of power was the only one that would be resorted to, and having made up their minds to this, Latimer said he should give them very little trouble. "I shall," said he, "offer them a plain account of my faith, and say but little more; for I know that any thing more will be to no purpose. They talk of free disputation; but I am assured, their grand argument will be, as it was that of their forefathers, *We have a law, and by our law ye ought to die.*" When he was brought into court, he had a cap on his head, buttoned under his chin, a pair of spectacles hanging at his breast, a new testament under his arm, and a staff in his hand. He was exhausted in pressing through the crowd, and was permitted to sit down; after a sufficient pause, he was told he must dispute against the articles brought against him; he declared he was unable, through age, to do any such thing; "I am not able to debate," said the venerable old man, "I will avow my faith, and then do with me as you please." He was next ensnared, by the artful conduct of his accuser, to make concessions which were against him, and upon this the prolocutor arose, and exclaimed to the populace, "Here you see the weakness of heresy against the truth; here is a man, who, adhering to his errors, hath given up the gospel, and rejected the fathers." The good old man made no reply, but wrapping his gown about him, and taking his new testament and his staff, walked out with the greatest composure. On the following Friday he was again brought into court, was first excommunicated, and then condemned to death. As soon as the sentence was read, Latimer, lifting up his eyes to heaven, exclaimed, "I thank God most heartily, that he hath prolonged my life to this end."

No steps were taken towards putting the sentence against the prelates into execution, for nearly a year and a half; but, in 1555, new laws in support of the Romish religion having been enacted, a commission was granted by cardinal Pole, the pope's legate in England, to the bishops of Lincoln, Gloucester, and Bristol, empowering them to try bishops Latimer and Ridley for heresy. The prelates were ordered before the commissioners, and when Ridley had been examined, bishop Latimer was brought to the bar, whom the bishop of Lincoln addressed, in an eloquent, and very pathetic speech, earnestly exhorting him to accept the mercy that was offered, and to acknowledge the authority of the see of Rome. The good bishop was too firmly fixed in his

opinions to give them up through motives of timidity, and the desire of prolonging his life. He was, however, remanded, and on the next day judgment was passed on him and Ridley. Their execution was fixed for the 16th of October, and the place fixed on was the north side of the city, near Baliol college. Left the bloody scene should excite a tumult, the military were ordered to attend the place of execution. On the day appointed, the vice-chancellor of Oxford, and other persons of distinction, repaired to the spot which was to witness the sufferings of these worthy men; the prisoners, at the fixed hour, were sent for, and the concern of the spectators, which was apparent in every countenance, excepting in those who were actors in the scene, was greatly augmented by the striking contrast of their appearance. Ridley was dressed in his episcopal habit, shewing what they had formerly been, and bishop Latimer wore his prison attire, by which he exhibited the condition to which they were now reduced. Having heard a sermon, by a Popish doctor, in which they were treated with great inhumanity, they prepared for their last trial, and were chained to the stake. The fire was speedily kindled, and at the sight of the flames Latimer exclaimed, "Be of good cheer, master Ridley, and play the man, we shall this day light such a candle, by God's grace, in England, as I trust shall never be put out." He then recommended his soul to God, and a few minutes put an end to the sufferings of these noble martyrs. Such was the glorious and triumphant end of Hugh Latimer, who had been indefatigable in the discharge of the duties of life, and who exhibited the most astonishing firmness and composure in the several trials to which he was exposed. He was not learned, in the usual sense of the word, for he cultivated only useful learning, and he lived rather what the world calls a good than a great man. He was eminent as a preacher, but his sermons, that are extant, are not patterns of good composition; his manner of preaching was affecting, as he spoke from the heart, and made deep and lasting impressions on his auditors. He displayed at all times a noble and apostolic zeal in the propagation of the truth. No one had a higher sense of what became his office, or was less influenced by any sinister motive; and none ever reproved vice with more freedom, without any regard to the rank of his hearers. A collection of his sermons was published, in 1570, by Augustus Berniere, a Swiss, who dedicated them to Catharine, the duchess of Suffolk. It consists of forty sermons, and has been frequently reprinted. In Mr. Fox's Acts and Monuments, several of his letters are preserved, among which is the celebrated one to king Henry VIII. for restoring the free liberty of reading the holy scriptures. Biog. Brit.

LATIN, a dead language, first spoken in Latium, and afterwards at Rome, and still used in the Romish church, and among men of letters.

Some authors rank the Latin among the number of original languages, but by mistake: it is formed principally from the Greek, and particularly from the Æolic dialect of that tongue; though it has a great number of words which it borrowed from the languages of the Etruscians, Oscians, and other ancient people of Italy; and foreign commerce and wars, in course of time, added a great many more.

The Latin is a strong, nervous language, perfectly suitable to the character of the people who spoke it. The Romans were engaged in wars and commotions, foreign and domestic, which for seven hundred years engrossed all their thoughts. Hence, therefore, says the ingenious Mr. Harris, their language became like their ideas, copious in all terms, expressive of things political, and well adapted

to the purposes both of history and popular eloquence. But the Romans were no philosophers; and hence the unsuitness of their language to this subject; a defect, which even Cicero is compelled to confess, and more fully makes appear, when he writes philosophy himself, from the number of terms he is obliged to invent. Harris's *Hermes*, p. 411, &c.

The Latin is more figurative than the English, less plain than the French, less copious than the Greek, less pompous than the Spanish, less delicate than the Italian, but closer and more nervous than any of them.

We may here observe, that the prosody both of the Greeks and Romans was carried much farther than ours; or that they spoke with more, and stronger, inflexions of voice than we use. The quantity of their syllables was much more fixed than in any of the modern languages, and rendered much more sensible to the ear in pronouncing them. Besides quantities, or the difference of short and long, accents were placed upon most of their syllables, the acute, grave, and circumflex: the use of which accents we have entirely lost, but which, it is well known, determined the speaker's voice to rise or fall. (See ACCENT and PROSODY.) We may also observe, that strong tones and animated gestures always accompany one another. The action both of the orators and the players in Greece and Rome was far more vehement than that to which we are accustomed. (See ACTION and GESTURE.) When the Barbarians spread themselves over the Roman empire, these more phlegmatic nations did not retain the accents, the tones and gestures, which necessity at first introduced, and custom and fancy afterwards so long supported, in the Greek and Roman languages. As the Latin tongue was lost in their idioms, so the character of speech and pronunciation began to be changed throughout Europe. The same attention was no longer paid to the music of language, or to the pomp of declamation, and theatrical action. The arrangement which commonly obtains in the Latin language consists in placing, first in the sentence, that word which expresses the principal object of the discourse, together with its circumstances; and afterwards the person, or the thing that acts upon it. Thus Sallust, comparing together the mind and body, uses the following expression; "Animi imperio, corporis servitio, magis utimur;" in which the order renders the sentence more lively and striking than when it is arranged according to our English construction; "We make most use of the direction of the soul, and of the service of the body." The Latin order more gratifies the rapidity of the imagination, which naturally runs first to that which is its chief object; and having once named it, carries it in view through the rest of the sentence. But though the common arrangement in the Greek and Roman languages is to place that first which strikes the imagination of the speaker most, yet this does not hold without exception. Sometimes regard to the harmony of the period requires a different order, and to this the ancients attended. The Latin order is more animated; but the English is more clear and distinct. The Romans generally arranged their words according to the order in which the ideas rose in the speaker's imagination. We arrange them according to the order in which the understanding directs those ideas to be exhibited in succession, to the view of another. Our arrangement, therefore, appears to be the consequence of greater refinement in the art of speech; as far as clearness in communication is understood to be the end of speech. The limitation of arrangement in the modern tongues is, in a great degree, owing to the disuse of those differences of termination, which, in the Greek and Latin, distinguished the several cases of nouns, and

tenes of verbs; and which, by means of these, pointed out the mutual relation of the several words in a sentence to one another, though the related words were disjoined and placed in different parts of the sentence. As articles contribute very much to the clearness and precision of language, the want of them in the Latin tongue is unquestionably a defect, though they recur for the supply of this defect to the use of pronouns. (See ARTICLE and PRONOUN.) Blair's Lectures, vol. i.

For a while the Latin tongue was confined almost wholly within the walls of Rome; nor would the Romans allow the common use of it to their neighbours, or to the nations they subdued. Cicero observed, that even in his time, Greek was used almost among every people, but the Latin only confined to a very narrow compass. By degrees they were brought to grant the use of it as a favour; and, in time, became sensible of the necessity there was of its being generally understood, for the conveniency of commerce: and, accordingly, used their utmost endeavours, that all the nations subject to their empire should be united by one common language: so that at length they imposed that as a law, which they had before granted as a favour.

After the translation of the seat of the empire from Rome to Constantinople, the emperors of the East, being always desirous of preserving the title of Roman emperors, appointed the Latin to be still retained in use, both in their rescripts and edicts, as appears by the constitutions of the eastern emperors, collected in the Theodosian Code; but at length the emperors, neglecting the empire of the West, abandoned all care of the Latin tongue, and allowed their judges to pass sentence in Greek; and, accordingly, we find the emperor Justinian's Novels are composed in Greek.

Charlemagne, coming to the empire of the West, appointed the law proceedings in foreign courts to be made in Latin; and the notaries were to draw their acts and instruments in the same tongue: this practice continued a long time through a great part of Europe; but at length it gave way, and the French took place of the Latin, not only in France, but, in some measure, in England too; and the reason given for it was, that abundance of difficulties arose about the understanding of Latin terms. See *LAW LANGUAGE*.

The Latin, however, was prodigiously degenerated and corrupted, before it came to be laid aside. The incursions of the Goths and Vandals into Italy brought an inundation of foreign words and phrases into it; inasmuch that Valla and Naud call Boethius the last Latin author. By command of Theodoric, king of the Goths, it was the hard fate of this worthy man, says Mr. Harris, to suffer death; with whom the Latin tongue, and the last remains of Roman dignity, may be said to have sunk in the western world. But that was not all; when it once got into the courts of justice, it was still worse handled; till, at last, being introduced amongst the monks, and become the common language of missals and breviaries, it was debauched to that degree, that it was almost become scandalous to use it.

In this condition it was found at the time of the Reformation, when Vives, Erasmus, &c. began to open the way for its recovery; since which time monkish Latinity has been declining, and all endeavours have been used to retrieve the pure language of the Angulitan age.

It was said of cardinal Bembo, that he would never read the breviary for fear of corrupting his fine Latin.

LATIN Bible. See BIBLE.

LATIN Character. See CHARACTER.

LATIN Church, is a term used for the Romish or western church, by way of opposition to the Greek church. See CHURCH.

LATINÆ FERIÆ. See FERIÆ.

LATINI, BRUNETTO, in *Biography*, an early reviver of literature in Italy, was born at Florence in the early part of the thirteenth century; he was employed, about the middle of that century, by the Guelphs, in Florence, as ambassador to Alphonso, king of Castile, with the view of obtaining aid against Manfred, king of Naples and Sicily. By the prevalence of the opposite party he was driven from his country, and retired to France. At Paris he opened a school of philosophy, and wrote several books. We find him in his native country in 1284, and acting as syndic at Florence. He died in 1294. The most celebrated of his works was his "Teforo," a compilation from various authors, in history, philosophy, rhetoric, and morals. He translated into the Italian language part of the first book of Cicero de Inventione, and he was author of a moral work in verse, entitled "Il Teforetto." He is represented as a profound rhetorician and philosopher, and is said to have been the first who began to polish the language, and refine the understanding of his countrymen. Though he does not appear to have been a public instructor at Florence, he probably gave private assistance in the studies of his friends, and he is mentioned as having been, in some measure, the tutor of Dante.

LATINI, LATINO, a learned Italian, was born at Viterbo in 1513. He studied several years at Sienna, with a view to jurisprudence, which an ill state of health obliged him to relinquish. He then assumed the ecclesiastical habit, went to Rome, and became librarian to cardinal Rodolfo Pio, who, dying in 1564, left Latini the bequest of his copious library. He was employed in the reformation of the Decretal of Gratian, first undertaken by desire of pope Pius IV. and published under Gregory XIII. and committed to the care of many of the most learned ecclesiastics of the Roman court. He died in 1593, and bequeathed all his books to the chapter of Viterbo. He was highly esteemed for his learning and industry, though his modesty did not permit him to publish any thing during his life-time. After his decease there appeared two volumes of his "Latin Letters, Poems, and other small Pieces." He communicated many emendations of Tertullian to the edition of that father published by Pamelius. His MS. annotations on the fathers, and on other authors, were given to the public in the "Bibliotheca Sacra et Profana," printed at Rome in 1667. Moreri.

LATINI, the *Latins*, in *Ancient Geography*, comprehended in general all the people of Latium, and particularly those who inhabited the territory along the Tiber from Rome to the sea. They were formed, it is said, by the union of the Aborigines, or of people whose origin was not known, of the Pelasgi, who had migrated from Thessaly, and of the Arcadians, brought thither by Evander, 60 years before the war of Troy.

LATION is used by some for the translation or motion of a body from one place to another.

LATISSIMUS COLLI, in *Anatomy*, a muscle of the neck, often called platysma myoides. See DEGLUTITION.

LATISSIMUS DORSI, is a muscle of the back, described under DORSI.

LATITAT, in *Law*, a writ, whereby all men in personal actions are called originally to the king's bench.

It has this name, as supposing the defendant lurks, lies hid, and cannot be found in the county of Middlesex, to be taken by bill; but is gone to some other county, to the sheriff whereof this writ is directed. See BILL of Middlesex.

LATITUDE, in *Geography* and *Astronomy*. The latitude of a place on the terrestrial globe is its angular distance from

## L A T I T U D E.

from the equator. It is measured on the meridian, being that part of it which is intercepted between the zenith of the place and the equator. See **MERIDIAN**.

If the place is situated to the north of the equinoctial line, it is said to have north latitude; if on the other side, its latitude is south.

When the spherical figure of the earth was once admitted, obvious methods, founded on astronomical principles, were immediately invented, to determine the latitude of places, or their relative situation to the equator. Previous to the establishment of this theory, nothing could be more vague and unsatisfactory than the methods employed by the ancients of determining the relative situations of the principal cities of the world to each other. But the knowledge of the true figure of the earth, not only suggested a more scientific division of its surface by imaginary circles, supposed to be drawn on its circumference; but by referring these circles to corresponding ones in the heavens, astronomy and geography were combined, and the principles of the former were successfully applied to the improvement of the latter. Long before the apparent motion of the heavens was known to arise from the real motion of the earth, the two points which we now call the poles were referred to those two points in the heavens which were observed to be stationary; and a great circle of the terrestrial sphere, supposed to be every where equally distant from the poles, was called the equinoctial line, and assumed as a principal circle, to which geographical situations were to be referred; and as astronomers, in taking the ecliptic for their principal circle, had defined the positions of the heavenly bodies by their distances from this circle, and a perpendicular to it, calling these distances *longitudes* and *latitudes*; so, in imitation of this method, geographers assumed the equinoctial line as their standard, and taking another circle perpendicular to it, they referred all positions on the earth to these circles by the same name. Hence longitude and latitude, in geography, are not defined in the same terms as in astronomy, being in the latter always referred to the ecliptic, and on the terrestrial globe to the equator. This circumstance often embarrasses the young student in astronomy, who is naturally at a loss to comprehend why the same terms should have such different significations, when applied to the terrestrial and celestial globe. It being once clearly understood that every point of the convex surface of the earth has at any given instant of time its corresponding point on the concave surface of the heavens, a number of methods were immediately suggested (and quite independent of actual measurement), for determining the situation of places, or their latitudes and longitudes as defined above. The most obvious method of defining the situation of points on a sphere, is to refer them to two great circles perpendicular to each other. On the celestial globe, whether we assume the equator or the ecliptic for one of these circles, we can have no hesitation in the choice of the other, because the equinoctial points are so remarkable, that they naturally indicate the advantage of making the second circle pass through them. Still, however, it must be remembered, that this choice is to a certain degree arbitrary; we might have assumed the equator or ecliptic for one principal circle, and for the other, a great circle perpendicular to either of them, which should pass through any remarkable fixed star, as Sirius, or Arcturus. The preference, however, has always been given to the equinoctial points, and, accordingly, as we assume the equator, or the ecliptic, as the principal circle, we define the situation of the different points by *right ascension* and *declination*, or by longitude and latitude. See **RIGHT ASCENSION**, and **DECLINATION**.

There is likewise another method occasionally employed by astronomers, but which relates only to their own particular situation at the moment of observation: this is by altitude and azimuth. The place of a heavenly body determined by this method is not permanent, but changes at every instant; and since no two observers can have the same zenith, no star can have the same altitude and azimuth at the same instant of time to different observers. See **ALTITUDE**, **AZIMUTH**, &c. &c.

In this latter method the principal circle assumed is the *horizon*, and the great circle perpendicular to it is that which passes through any two opposite cardinal points, as the North and South, or the East and West.

Let us now consider the terrestrial globe. Here the equinoctial line presents itself as the great circle, of all others the most proper for our purpose; but what is to guide our choice in the selection of another great circle perpendicular to it? We are not here assisted, as in the celestial globe, by finding any one point possessing some remarkable property peculiar to itself; and even if there were such a point arising from local circumstances, it would have no representation in the heavens; and, therefore, would not facilitate the object of our present investigation, which is to shew by what method astronomers have contrived to determine the situation of points on the earth's surface, by finding their corresponding zenith points in the heavens.

Finding, therefore, but one great circle on the terrestrial globe indicated by nature, astronomers and geographers have been obliged to assume a second from circumstances entirely accidental. The first meridian has been differently assumed by writers of different countries. The French astronomers divide the terrestrial globe by two great circles; one of which is the equator, the other a great circle passing through the observatory of Paris, and to these great circles all other places are referred; hence, according to their definitions, if a great circle be conceived to pass through any place, and to be perpendicular to the equator, then the latitude of that place will be the arc of this secondary circle between the equator and the place, and its longitude will be the arc of the equator, intercepted between this great circle and that which in a similar manner passes through the observatory of Paris.

English geographers and astronomers, in like manner, suppose their first meridian to pass through the Royal Observatory of Greenwich.

Having thus minutely described what is meant by longitude and latitude, both on the celestial and terrestrial globe, it remains to explain the different problems connected with the subject, and, agreeably to the arrangement adopted in this work, we shall confine ourselves as much as possible to that part of the subject connected with *Latitude*, referring to *Longitude* that which more immediately belongs to it.

The theory of finding the latitude of a place by astronomical observation is so simple, that it may be understood by merely inspecting a celestial globe. See **GLOBE**.

The meridian (*Plate XVI. fig. 147. Astronomy.*) rises (in our latitudes) in the north point of the horizon *O*, passes through the pole *P*, through the zenith, and crosses the equator *Æ* before it meets the southern point of the horizon. It is thus divided into four parts:

*P O* = the latitude,  
*P Z* = the co-latitude,  
*A Z* = the latitude,  
*H Æ* = the co-latitude.

It is evident, that if the value of either of these four arcs can be determined, the latitude is known.

The most ancient method of determining the latitude was by

# LATITUDE.

by means of a gnomon; in this case the mean of the greatest and least altitude of the sun was taken, which is always equal to the co-latitude, or A.H. The altitude of the equator above the horizon, and the complement of this to 90°, is the latitude of the place. See GNOMON.

We shall first give the methods of determining the latitudes of fixed observatories on shore, and then describe those which are best adapted to perform the same operation at sea.

*Method of determining the Latitude of a fixed Observatory.*—The best method of determining the latitude of a fixed observatory, is by a long series of observations of the pole-star, made with an 18-inch repeating circle of Borda. The method of adjusting and observing with this instrument has been already sufficiently explained under CIRCLE and DECLINATION. But as this instrument is not in this country in very general use, we shall suppose the observer to be in possession of an astronomical circle or quadrant, or some equivalent instrument adapted to the determination of zenith distances by meridional observations.

The latitude of an observatory may be determined with very considerable accuracy by zenith distances of the sun when near the summer solstice, as the obliquity of the ecliptic is very correctly ascertained; but the most preferable method is certainly by a regular series of observations on circumpolar stars. Polaris, and  $\beta$  Ursæ minoris, are the most eligible stars for this purpose. They should be observed continually, both above and below the pole, and all the observations carefully reduced to the first of January, of the year in which the observations are made. It is evident, that the mean of the altitudes above and below the pole, will be the altitude of the pole itself. The accuracy of the result will depend on the goodness of the instrument, the skill of the observer, and the exactness with which the necessary corrections have been applied. When the altitude of a heavenly body is taken with an astronomical instrument, the observer must first consider what correction is required from the nature and construction of the instrument itself; such as the error of collimation, or index error, error of division, &c. This being properly allowed for, the observation is next to be corrected for refraction, and here attention must be paid to the state of the barometer and thermometer, and the mean refraction corrected accordingly. The true altitude, or zenith distance, being thus ascertained, the next step is to determine what would have been the true zenith distance if the observation had been made on the first of January, instead of the given day. For this purpose we must apply the precession, aberration, solar and lunar nutation, and likewise a correction arising from the proper motion of the star whenever this can be known. By a careful discussion of a series of observations thus corrected, the latitude is to be obtained, and with a good two-foot circle a skilful observer will never err above a second or two from the truth, except from the little remaining uncertainty which still attends the subject of astronomical refractions.

In the Philosophical Transactions for 1806, Mr. Pond suggested a method of correcting the respective latitudes of any two observatories, by means of the catalogues of stars made at each of them, and applied it with success to the correction of the latitude of Palermo. The principle of the method is this: If the declinations of a number of stars are observed at two observatories, subject only to the errors of division in the respective instruments, the positive and negative errors may be naturally expected to be nearly equal to each other: if, therefore, the declinations of one catalogue should be all either greater or less than in the other, it would

indicate that the error was in the assumed latitude, which enters as a common element of calculation, and not in the observations themselves. Now if such a correction be applied to the latitude of each observatory, as will make the sum of the positive differences equal to the sum of the negative, the latitudes thus corrected will be much more accurately determined than by any method that can be practised separately.

Examples of deducing the latitude from observations of the sun; taken from the Greenwich Observations of 1810.

1810, June 18, ☉'s L. L. zen. dist.	28	19	6.3
☉'s U. L. -	27	47	34.1
	2)56	6	40.4

Zenith distance, ☉'s centre	28	3	20.2
Error of collimation	-	-	+ 4.6
Error of division	-	-	+ 1.0
Refraction	-	-	+ 30.0
Parallax	-	-	- 4.1
True zenith distance	28	3	42.5
☉'s declination	23	24	56.0
Latitude deduced	51	28	38.5

1810, June 21, Z. D. ☉'s centre	28	0	38.8
Error of collimation	-	-	+ 4.6
Error of division	-	-	+ 1.0
Refraction	-	-	+ 29.9
Parallax	-	-	- 4.1
True zenith distance	28	1	1.0
☉'s declination	23	27	37.0
Latitude deduced	51	28	38.0

1810, June 23, Z. D. ☉'s centre	28	0	58.9
Error of collimation	-	-	+ 4.6
Error of division	-	-	+ 1.0
Refraction	-	-	+ 30.1
Parallax	-	-	- 4.1
True zenith distance	28	1	21.3
☉'s declination	23	27	20.0
Latitude deduced	51	28	41.3

1810, June 24, Z. D. ☉'s centre	28	1	42.8
Error of collimation	-	-	+ 4.6
Error of division	-	-	+ 1.0
Refraction	-	-	+ 30.0
Parallax	-	-	- 4.1
True zenith distance	28	2	5.1
☉'s declination	23	36	34.0
Latitude deduced	51	28	39.1

*Results.*

# LATITUDE.

## Results.

June 18	-	-	-	51	28	38.5
21	-	-	-			38.0
23	-	-	-			41.3
24	-	-	-			39.1
						356.9
Mean of 4	-	-	-	51	28	39.2

This method is subject to whatever error may exist in the solar tables relative to the declination of the sun. The fol-

lowing method is, therefore, preferable, and is quite independent of the errors of the solar tables.

Let the sun be observed as often as possible within ten or twelve days of each solstice, and let each observation be reduced to the solstice, either by Guerin's tables or by direct calculation. Then, after the proper correction for nutation, parallax, and error of collimation has been duly applied, let the solstitial zenith distances be added together; half their sum will be the zenith distance of the equator, or the latitude of the place.

The following example is taken from Dr. Bradley's Observations, for the purpose of determining the latitude of the Royal Observatory at Greenwich.

1753- Dec.	☉'s Longitude.				Reduction to Solstitial Point.			Obs. Z. D. corrected for Refraction.			Solstitial Z. D. with Parallax.			Dr Bradley's Refraction.		
	s	o	l	"	o	l	"	o	l	"	o	l	"	o	l	"
3	8	11	34	43	1	16	6.2	73	40	53.5	74	56	59.7	3	21	3
8	8	16	39	52		40	8.6	74	16	47.0	74	56	55.6	3	22	9
18	8	26	50	30		2	16.0	74	54	39.5		56	55.5	3	27	5
26	9	5	0	0		5	40.6	74	51	12.3		56	52.9	3	23	4
27	9	6	1	19		8	14.0	74	48	33.8		56	53.8	3	28	8
28	9	7	2	34		11	15.3	74	45	39.9		56	55.2	3	34	6
29	9	8	3	42		14	44.2	74	42	11.7		56	55.9	3	38	1
30	9	9	4	57		18	41.5	74	38	13.3		56	54.8	3	40	2
31	9	10	6	7		23	6.2	74	33	49.8		56	56.0	3	38	3
9 Mean.																
Mean day, Dec. 17, long. D $\Omega$ 6 <sup>s</sup> 23 <sup>o</sup> 39'											Nutation +			74 56 55.49		
											Parallax -			8.73		
														8.50		
With Dr Bradley's refraction mean of thermometers											74 56 55.72					
Additional correction for refraction											-			1.46		
Winter solstitial zenith distance											74 56 54.26					
1754- June,																
7	2	16	30	40		41	4.0	28	41	39.8	28	0	33.8	0	30	8
14	2	23	11	49		10	30.0	28	10	58.0		28.0	0	29	0	
15	2	24	9	3		7	46.0	28	8	22.0		36.0	0	29	7	
20	2	28	55	23		0	15.8	28	0	51.6		35.8	0	30	3	
23	3	1	47	1		0	43.4	28	1	21.0		37.6	0	29	6	
25	3	3	41	32		3	5.8	28	3	42.5		36.7	0	29	3	
26	3	4	38	45		4	54.0	28	5	30.8		36.8	0	29	4	
30	3	8	27	31		16	13.0	28	16	49.6		36.6	0	29	6	
8 Mean.																
Mean day, June 18, long. D $\Omega$ 6 <sup>s</sup> 14 <sup>o</sup>											Nutation			28 0 35.19		
											Parallax			- 9.3		
														- 4.0		
Additional correction for refraction											28 0 21.86					
											+			0.10		
Summer solstitial zenith distance											28 0 21.96					

# LATITUDE.

Winter solstice	-	74° 56' 54.26"
Summer solstice	-	28 00 21.96
Sum	-	102 57 16.22
Half sum or latitude		51 28 38.11

By taking half the difference, the obliquity of the ecliptic is determined at the same time.

		74° 56' 54.26"
		28 00 21.96
Sum	-	46 56 32.30
Half difference or obliquity of the ecliptic for 1753	-	23 28 16.15

Notwithstanding this method appears so unobjectionable in theory, the uncertainty of refraction at the winter solstice renders it less exact than a series of observations of the pole-star, observed constantly above and below the pole.

*Example.*—The mean of 94 zenith distances of the pole-star at Greenwich above the pole, reduced to Jan. 1, 1749, is, according to Dr. Bradley's observations,

Mean of 100° below the pole		36° 29' 48.3"
		40 33 39.29
Co-lat.	-	77 2 44.12
Or latitude of Greenwich	-	38 31 22.06
And polar distance of *	-	51 28 38
		2 2 17.23

*On the method of finding the latitude at sea.*—The method of finding the latitude at sea by a meridional observation of the sun or star, differs so little from that above explained,

and is so fully described in books which mariners are never unprovided with, that scarcely any thing need be added on the subject. Some of the nicer corrections used at land may be omitted, and others will be necessary; such as the correction for the depression of the horizon, and the index error of the sextant, all which are to be found in every book of navigation. (See DEPRESSION.) The latitude may be found either by taking the meridian altitude of the sun, moon, or fixed star. But it sometimes happens that, in the winter season, a meridian altitude cannot be taken for many days together: in that case, recourse must be had to two altitudes of the sun taken at different times, the interval between the two observations being supposed to be given by a pocket chronometer.

Many able mathematicians have successfully laboured to improve this problem, and to render it easy to mariners. Mr. Professor Lax of Cambridge presented a very valuable paper on this subject to the Royal Society in 1799, in which a method is given of finding the latitude by a double observation, with extreme precision; and Dr. Brinkley likewise constructed a set of very useful tables, which were for some time annually inserted in the Nautical Almanacs.

*Problems relating to the finding the longitude and latitude of the heavenly bodies, from their observed passage over the meridian, with their zenith distance.*

We have already explained, under DECLINATION and RIGHT ASCENSION, how these quantities are obtained. We shall now add an example of the calculation, by which the longitude and latitude are deduced from an observed right ascension and declination.

*Example.*—October 2, 1811. The right ascension of the comet was obtained from observation 6<sup>h</sup> 23<sup>m</sup> 42<sup>s</sup> 13", and its declination 49° 31' 2" N.; required its longitude and latitude.

*Example.*

{ Dec.	49° 31' 2"	t.	10.0687655		
{ A. R.	6 <sup>h</sup> 23 <sup>m</sup> 42 <sup>s</sup> 13	f.	9.6042320	t.	- - 9.6425085
A.	71 3 40	t.	10.4645335	-	10.4645335
Obliqu. of ec.	23 27 41	-	-	Co. ar. cof. A.	0.0241707
		-	-	B. cof.	8.8968049
		-	-	t.	9.0280176
O + A = B	94 31 21	t.	11.1018408		
		t.	9.0280176		
		{ Cof.	9.9975435		
Lat.	53 17 9	t.	10.1274019	{ Longitude	5 <sup>h</sup> 23 <sup>m</sup> 54 <sup>s</sup> 52"
		-	-	{ Latitude	0 53 17 9

Vide Introduction to Taylor's Logarithms.

Or thus, as a verification of the preceding method.

O. 23° 27' 41"		Co. ar. cof.	0.0374751		f. 9.6000260
A. R.	-	-	t. 9.6425085	-	-
A.rox. long.	6 <sup>h</sup> 25 <sup>m</sup> 34 <sup>s</sup> 35"	t.	9.6799836	-	f. 9.6351962
Eclipt. dec.	9 53 50	-	-	-	f. 9.2352222
* declination	49 31 2	-	-	-	-
	59 24 52	t.	0.22837	-	f. 9.9349377
O	-	f.	9.60003	-	cof. 9.9625249
A. R.	-	Cof.	9.96172	Eclip. dec. ar. co. cof.	0.0065119
	1 1 39 54	t.	9.79012	Latitude	53° 17' 9"
Long.	5 23 54 41	-	-	-	f. 9.9039745

# LATITUDE.

*Example 2.*—December 2, 1811. The right ascension of the comet was  $9^{\circ} 35' 24'' 32''$ , declination  $8^{\circ} 55' 48''$  N. required its longitude and latitude.

	{ Dec. $8^{\circ} 55' 48''$				
	{ A. R. $9^{\circ} 25' 24'' 43$		t. 9.1962655	-	t. 10.3232835
			f. 9.9558170		
A.	9 52 6.2		t. 9.2404485	C. a. cof. A.	0.0064938
O.	23 27 41			cof. B.	9.9219578
	<hr/>				
B.	33 19 47.2		t. 9.8179760		10.2517151
			f. 9.9407453		}
			<hr/>		
			t. 9.7587218	Latitude	$29^{\circ} 50' 42''$ N.

Or thus,

O	-	-	-	Co. ar. cof.	0.0374751
A. R.	-	-	-	t.	10.3232835
					f. 9.6000260
App. long.	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
Ecliptic dec.	28 24 24				f. 9.5622744
Dec.	28 55 48				
	<hr/>				
	30 20 12			t. 9.76731	f. 9.7033602
O	-	-	-	f. 9.60003	cof. 9.9625249
A. R.	-	-	-	cof. 9.63253	Ecl. dec. cof. 0.0310441
					<hr/>
	5 42 32			t. 8.99987	f. 9.6069292
Long.	9 29 15 15				<hr/>
					Lat. 29 50 42

When the moon's longitude and latitude are to be deduced from its observed right ascension and zenith distance, the process is much longer; and as the calculation is not given at length in any author we are acquainted with, we shall add an example, with the method of comparing it with the Nautical Almanac.

First, compute the mean time by Dr. Maskelyne's folio tables, or other equivalent solar tables. To the mean time of the transit thus found, apply the equation of time taken out of the Nautical Almanac with a contrary sign, and this will be true or apparent solar time. From the moon's horizontal equatorial parallax, taken from the Nautical Almanac, subtract the correction, page 75 of Mayer's Lunar Tables, (or, still more correctly, a quantity which will be given in a table we propose to annex to the article PARALLAX,) the remainder will be the moon's horizontal parallax. From the observed zenith distance of the  $\mathcal{D}$ 's U L or L L corrected for refraction, subtract the constant quantity  $10' 3''$ , which is the angle the vertical makes with the radius, (see DEGREE and Figure of the EARTH,) and add the log. sine of remainder to the log. sine of  $\mathcal{D}$ 's horizontal parallax, the sum will be the log. sine of  $\mathcal{D}$ 's parallax in zenith distance; which subtracted from the observed zenith distance, gives the corrected zenith distance. To this add  $\mathcal{D}$ 's horizontal semidiameter, (taken from Nautical Almanac,) if U L was observed; or subtract, if L L; and thus the correct zenith distance of the  $\mathcal{D}$ 's centre will be obtained. The difference of this quantity, and the latitude of the place,  $\pm$  error of collimation, will give the required declination north or south, as the first is greater or less than the second.

But if the  $\mathcal{D}$ 's zenith distance was not observed exactly at the time of the transit of the preceding or subsequent enlightened limb, this declination must be corrected by the following proportion

As 12 hours is to the interval of time between the two observations, so is the variation of declination on 12 hours by the ephemeris to the correction required, and which must be thus applied:

$\mathcal{D}$ 's zenith distance observed before transit of limb,	{	$\mathcal{D}$ 's declination increasing, add. $\mathcal{D}$ 's declination decreasing, subtract.
$\mathcal{D}$ 's zenith distance observed after transit of limb,	{	$\mathcal{D}$ 's declination increasing, subtract. $\mathcal{D}$ 's declination decreasing, add.

Thus the true declination will be obtained from observation.

From log. sine of  $\mathcal{D}$ 's horizontal semidiameter, subtract log. cosine of  $\mathcal{D}$ 's true declination, the remainder will be log. sine of  $\mathcal{D}$ 's semidiameter in A. R., which add, if preceding limb was observed, namely, before the full; or subtract, if  $\mathcal{D}$ 's subsequent limb was observed after the full, to or from A. R. of limb; and this will give the true A. R. of  $\mathcal{D}$ 's centre.

Next with the apparent time previously found, compute the  $\mathcal{D}$ 's longitude and latitude by proportion from the Nautical Almanac, and apply the corrections for a second difference (from Taylor's Sexagesimal Tables). N. B. Compute the proportional part of the moon's motions in longitude doubly by the rule of practice, by changing the second and third terms of the proportion for each other, for greater certainty.

Then from the true A. R. and declination found above, and the apparent obliquity of the ecliptic, compute the longitude and latitude by Dr. Maskelyne's rules, annexed to the precepts prefixed to Taylor's Logarithms, and the difference between this and the longitude and latitude, found as above by proportioning from the Nautical Almanac,

gives

# LATITUDE.

gives the error of the tables. N. B. Compute the longitude and latitude from A. R. and declination assumed to the nearest second over or under; and after the operation, correct it, that is, as much as the true A. R. exceeds or falls

short of that found. And as much as the true declination is north or south of that assumed, so much the true latitude may be north or south of that found; which correct accordingly.

Example of the calculation of the moon's longitude and latitude, January 6, 1811, and compared with the Nautical Almanac.

		<i>H. M. S.</i>		
1811,	- - -	18 37 0.24	Tab. 19. } 20. } 14. }	Dr. Maskelyne's folio Tables.
January 6	- - +	0 23 39.30		
Equat. of equinoxes	- - -	0 00		
		<hr/>		
A. R. D's 1st L.	- - -	19 0 39 54 4 55 15.60	= 2° 13' 48" 54.0"	
		<hr/>		
Table 21	- - -	9 54 36.06 1 37.42	D's femidiameter - 15 3.7	
		<hr/>		
Mean time	- - -	9 52 58.64	Equatorial parallax - 55 17.2	
Equation of time	- - -	- 6 10.39	Reduction - - - 8.6	
		<hr/>		
Apparent time	- - -	9 46 48.25	Horizontal parallax - = 55 8.6	
		<hr/>		
D's L. L.	- - -	34° 27' 53.3"		
Refraction	- +	0 41.4		
Error quad.	- +	0.7		
		<hr/>		
Z. D. L. L.	- =	34 28 35.4	Horizontal parallax fin. - 8.20521	
∠ radius of ⊕ with vertical	- -	10 3		
		<hr/>		
		34 18 32.4	- - - - fin. - 9.75101	
		<hr/>		
Parallax	- - -	31 4.9	fin. - 7.95622	
Z. D. L. L.	- - -	34 28 35.4		
		<hr/>		
Z. D. correction for parallax	- - -	33 57 30.5		
D's femidiameter	- - -	15 3.7		
		<hr/>		
Z. D. centre	- - -	33 42 26.8	D's femidiameter fin. - 7.64160	
Lat. + error of collimation	= -	51 28 44.6		
		<hr/>		
Declination N.	- =	17 46 17.8	- - - - cof. - 9.97876	
		<hr/>		
D's femidiameter in A. R.	+ -	15 49.0	7.66284	
A. R. D's 1st L.	- - -	2° 13' 48" 54.0		
		<hr/>		
A. R. centre	- - -	2 14 4 43.0		

For the D's longitude and latitude by Dr. Maskelyne's rule.

Declination	0° 17' 46" 18"	tan.	9.5058544	tan.	- 10.5447574
A. R.	2 14 4 43	fin.	9.9830121		
		<hr/>			
A	18 26 0.6	tan.	9.5228423	Co. ar. cof. A. 0.0228751	
O	23 27 40.7				
		<hr/>			
B	5 1 40.1	tan.	8.9443726	Cof. B. - 9.9983258	
		<hr/>			
		Long. fin.	9.9845374	Tan. longitude 10.5659583	
		<hr/>			
Latitude S.	= 4 51 10.1	tan.	8.9289100	True longi- } = 2° 14' 48" 4".6 tude - }	
Cor. for decl.	+ .2				
		<hr/>			
True latitude	4 51 10.3 S.				

# LATITUDE.

## Second Method.

Obliquity -	☉ 23° 27' 40.7"	Co. ar. cof.	0.0374748 - - fin. 9.6000245
A. R.	-	tan.	10.5447574
Approx. longitude	2 15 20 8.7	tan.	10.5822322 - - fin. 9.9856179
Ecliptic declination	22 39 13.5	-	fin. 9.5856424
☽'s declination	17 46 18.0	-	-
Approx. latitude	4 52 55.5	tan.	8.93153 - - fin. 8.9299574
Obliquity	-	fin.	9.60002 - - cof. 9.9525252
Ecliptic declination co. ar. cof.	-	-	-
A. R.	-	cof.	9.43825
Correction	32' 4.0"	tan.	7.0980
Approx. longitude	2° 15' 20 8.7	-	-
Longitude	2 14 48 4.7	4° 51' 10.1" S.	fin. 8.9273518
		+	.2
	Latitude north	4 51 10.3	

### Moon's longitude by Nautical Almanac.

Jan. 5.	Mid.	5 0 1 11	1ft Diff.	Mean of 2d Difference.
6. Noon	2 9 44 19	6 14 51		
6. Mid.	2 15 56 43	6 12 24	- 2' 21".5	
7. Noon	2 22 6 51	6 10 08		

### Moon's latitude by Nautical Almanac.

Jan. 5.	Mid.	0 1 11	1ft Diff.	Mean of 2d Difference.
6. Noon	4 43 26	4 30 39	+ 12 47	
6. Mid.	4 52 47	4 58 37	+ 9 21	- 3' 2".85
7. Noon	4 58 37		+ 5 50	

In the following examples the second and third terms of the proportion are reversed by way of proof.

H.	H. M. S.
As 12 : 6 12 24 ::	9 46 48.25
H. { 6 3 6 12.00	0 6 4 53 24.12
{ 2 1 2 4.00	1 6 4 53 40
{ 1 31 2.00	1 6 4 53.40
M. { 30 15 31.00	1 6 4.89
{ 15 7 45.50	" { 18 14.67
{ 1 31.03	
S. { 30 15 51	
{ 15 7 75	
{ 3 1.55	
{ 3 0.16	
5 3 30.50	5 3 30.48
Equation of second difference	+ 10.68
☽'s longitude, January 6, noon	2 9 44 19
☽'s longitude by Naut. Almanac	2 14 48 0.16
Ditto by observation	2 14 48 4.60
Error of Nautical Almanac	- 4.44

H.	H. M. S.
As 12 : 9 21 ::	9 46 48.25
H. { 6 4 40.50	6 4 53.40
{ 2 1 33.50	1 2 1 37.80
{ 1 46.75	1 48.90
M. { 30 23.37	20 16.30
{ 15 11.69	" { 1 0.82
{ 1 .78	
S. { 30 .39	
{ 15 .19	
{ 3 .04	
{ 3	
7 37.21	+ 7 37.22
Equation of second difference	+ 15.68
☽'s latitude, January 6, noon	+ 7 52.90
☽'s latitude by Naut. Almanac	4 43 26
Ditto by observation	4 51 18.90
Error of Tables	- 4 51 10.3
	+ 8.6

*On the secular variation in Longitude and Latitude of the fixed stars.*

We have already explained, under ECLIPTIC, the cause of the change of position in this circle, which produces a secular variation both in the longitude and latitude of the fixed stars. The following table by M. Zach is intended to facilitate the calculation of this quantity, and has not yet been published in this country.

The formulæ used for the construction of these tables are, Sec. var. north lat = 52".6318 fin. (long \* + 8 53' 13') Sec. diminut. in long. 52".6318 cof. (long \* + 8 53' 13') tang. lat. \*. See PRECESSION.

*Examples of the use of the following tables.*

Let it be required to find the secular variation in latitude and longitude of Aldebaran for 1700—1800.

## LATITUDE.

The long. of Aldebaran for 1750 =  $2^{\circ} 6' 16''$   
 Latitude fourth - - - - -  $5' 29'' 16''$   
 Var. in lat. by Table III. for  $2^{\circ} 6'$  +  $50.812$   
 Prop. part for 18' - - - - - +  $0.070$   


---

 Sum - - - - -  $50.882$

Arg. lat.  $5^{\circ} 29' 16''$ , Table I. — angle  $\alpha = 2^{\circ} 29' 27'' 0''$ .  
 This will give two arguments with which enter Tab. IV.  
 Arg. I. =  $2^{\circ} 6' 18' + 2^{\circ} 29' 27' = 5^{\circ} 5' 45' = + 253.75$   
 Arg. II. =  $2 6 18 - 2 29 27 = 11 6 51 = - 255.04$   


---

 —  $1.29$

But the latitude being fourth, the sign must be changed: the secular diminution of latitude is therefore  $-50''.882$ .

To find the secular variation in longitude.—First find the subsidiary angle  $\alpha$ .

Since the latitude is fourth, the sign must be changed: therefore the secular increase of longitude of Aldebaran is  $1''.29$ .

### Auxiliary Angle $\alpha$ for calculating the secular Variation in Longitude.

Arg. Lat.	Angle $\alpha$ + 11 $^{\circ}$	Diff.	Arg. Lat.	Angle $\alpha$ + 11 $^{\circ}$	Diff.	Arg. Lat.	Angle $\alpha$ + 11 $^{\circ}$	Diff.
0	0 0.0	6.0	30	26 41.4	8.1	60 0	20 1.5	12.3
1	29 54.0	6.0	31	26 33.3	8.3	60 30	19 49.2	12.8
2	29 48.0	6.0	32	26 25 0	8.4	61 0	19 36.4	13.2
3	29 42.0	6.0	33	26 16.6	8.6	61 30	19 23.2	13.6
4	29 36.0	6.1	34	26 8.0	8.9	62 0	19 9.6	14.1
5	29 29.9	6.0	35	25 59.1	9.1	62 30	18 55.5	14.6
6	29 23.9	6.1	36	25 50.0	9.3	63 0	18 40.9	15.1
7	29 17.8	6.1	37	25 40.7	9.6	63 30	18 25.8	15.7
8	29 11.7	6.1	38	25 31.1	9.8	64 0	18 10.1	16.2
9	29 5.6	6.2	39	25 21.3	10.1	64 30	17 53.9	16.9
10	28 59.4	6.2	40	25 11.2	10.4	65 0	17 37.0	17.5
11	28 53.2	6.3	41	25 0.8	10.8	65 30	17 19.5	18.3
12	28 46.9	6.3	42	24 50.0	11.0	66 0	17 1.2	19.0
13	28 40.6	6.3	43	24 39.0	11.5	66 30	16 40.2	19.8
14	28 34.3	6.4	44	24 27.5	11.9	67 0	16 22.4	20.6
15	28 27.9	6.5	45	24 15.6	12.3	67 30	16 1.8	21.6
16	28 21.4	6.6	46	24 3.3	12.7	68 0	15 40.2	22.6
17	28 14.8	6.6	47	23 50.6	13.2	68 30	15 17.6	23.6
18	28 8.2	6.7	48	23 37.4	13.7	69 0	14 54.0	24.8
19	28 1.5	6.7	49	23 23.7	14.3	69 30	14 29.2	26.0
20	27 54.8	6.8	50	23 9.4	15.0	70 0	14 3.2	27.3
21	27 48.0	6.9	51	22 54.4	15.6	70 30	13 35.9	28.9
22	27 41.1	7.0	52	22 38.8	16.3	71 0	13 7.0	30.4
23	27 34.1	7.2	53	22 22.5	17.1	71 30	12 36.6	32.1
24	27 26.9	7.3	54	22 5.4	18.0	72 0	12 4.5	34.0
25	27 19.6	7.4	55	21 47.4	19.0	72 30	11 30.5	36.0
26	27 12.2	7.5	56	21 28.4	19.9	73 0	10 54.5	38.3
27	27 4.7	7.6	57	21 8.5	21.1	73 30	10 16.2	40.8
28	26 57.1	7.8	58	20 47.4	22.3	74 0	9 35.4	43.5
29	26 49.3	7.9	59	20 25.1	23.6	74 30	8 51.9	46.7
30	26 41.4		60	20 1.5		75 0	8 5.2	

# LATITUDE.

Auxiliary Angle for calculating the secular Variation in Longitude.

Arg. Lat.	Angle $\beta$ + 11°	Diff.	Arg. Lat.	Angle $\beta$ + 11°	Diff.	Arg. Lat.	Angle $\beta$ + 1°	Diff.
75 0	27 51.7	4.6	86 10	21 25.0	23.6	88 55	28 4.4	181.5
75 30	27 47.1	5.0	86 20	21 1.4	26.0	89 0	25 2.9	40.9
76 0	27 42.1	5.4	86 30	20 35.4	13.9	89 1	24 22.0	42.8
76 30	27 36.7	5.7	86 35	20 21.5	14.7	89 2	23 39.2	44.5
77 0	27 31.0	6.2	86 40	20 6.8	15.3	89 3	22 54.7	46.7
77 30	27 24.8	6.6	86 45	19 51.5	16.3	89 4	22 8.0	48.9
78 0	27 18.2	7.2	86 50	19 35.2	17.1	89 5	21 19.1	51.3
78 30	27 11.0	7.9	86 55	19 18.1	18.1	89 6	20 27.8	53.9
79 0	27 3.1	8.7	87 0	19 0.0	19.2	89 7	19 33.9	56.7
79 30	26 54.4	9.5	87 5	18 40.8	20.2	89 8	18 37.2	59.9
80 0	26 44.9	10.5	87 10	18 20.6	21.6	89 9	17 37.3	63.3
80 30	26 34.4	11.6	87 15	17 59.0	22.9	89 10	16 34.0	67.0
81 0	26 22.8	13.0	87 20	17 36.1	24.4	89 11	15 27.0	71.2
81 30	26 9.8	14.6	87 25	17 11.7	26.1	89 12	14 15.8	76.0
82 0	25 55.2	16.6	87 30	17 45.6	27.9	89 13	12 59.8	81.2
82 30	25 38.6	18.9	87 35	16 17.7	30.1	89 14	11 38.6	87.1
83 0	25 19.7	21.8	87 40	15 47.6	32.3	89 15	10 11.5	94.1
83 30	24 57.9	25.4	87 45	15 15.3	34.9	89 16	8 37.4	102.0
84 0	24 32.5	9.5	87 50	14 40.4	37.7	89 17	6 55.4	111.3
84 10	24 23.0	10.0	87 55	14 2.7	41.4	89 18	5 4.1	122.6
84 20	24 13.0	10.7	88 0	13 21.6	44.8	89 19	3 1.5	136.5
84 30	24 2.3	11.3	88 5	12 36.8	49.1	89 20	0 45.0	154.0
84 40	23 51.0	11.9	88 10	11 47.7	54.1	89 21	28 11.5	177.5
84 50	23 39.1	12.9	88 15	10 53.7	59.7	89 22	25 13.5	211.0
85 0	23 26.2	13.7	88 20	9 53.9	66.4	89 23	21 42.5	266.0
85 10	23 12.5	14.7	88 25	8 47.5	74.5	89 24	17 16.5	386.5
85 20	22 57.8	15.8	88 30	7 33.0	84.0	89 25	10 50.0	650.0
85 30	22 42.0	17.0	88 35	6 9.0	95.7	89 26	0 0.0	
85 40	22 25.0	18.4	88 40	4 33.3	109.9			
85 50	22 6.6	19.9	88 45	2 43.4	127.9			
86 0	21 46.7		88 50	0 35.5				

# LATITUDE.

Secular Variation of Latitude of Northern Stars.

Argument. Longitude of the Star.

If the Latitude is South change the Sign.							
Deg.	0° +	1° +	II° +	III° +	IV° +	V° ±	Deg.
0	8.130	"	"	"	"	"	0
1	9.036	33.041	49.098	52.000	40.668	18.959	1
2	9.940	33.751	49.421	51.850	40.386	18.100	2
3	10.840	34.450	49.730	51.685	39.790	17.235	3
4	11.738	35.139	50.024	51.503	39.183	16.364	4
		35.818	50.302	51.306	38.564	15.488	
5	12.631	36.486	50.564	51.093	37.933	14.608	5
6	13.521	37.142	50.812	50.865	37.290	13.723	6
7	14.407	37.787	51.043	50.622	36.636	12.834	7
8	15.288	38.421	51.259	50.363	35.971	11.941	8
9	16.165	39.043	51.460	50.088	35.295	11.045	9
10	17.036	39.653	51.645	49.798	34.608	10.144	10
11	17.903	40.251	51.814	49.493	33.911	9.242	11
12	18.764	40.837	51.968	49.173	33.204	8.337	12
13	19.619	41.410	52.105	48.838	32.486	7.429	13
14	20.468	41.971	52.227	48.489	31.758	6.518	14
15	21.311	42.510	52.333	48.124	31.021	5.605	15
16	22.148	43.053	52.423	47.745	30.274	4.691	16
17	22.978	43.574	52.496	47.351	29.518	3.776	17
18	23.801	44.083	52.554	46.943	28.753	2.859	18
19	24.617	44.578	52.596	46.520	27.979	1.941	19
20	25.424	45.060	52.622	46.083	27.197	1.023	20
21	26.225	45.528	52.632	45.633	26.406	0.105	21
22	27.017	45.982	52.626	45.169	25.608	0.814	22
23	27.801	46.422	52.603	44.690	24.802	1.332	23
24	28.576	46.847	52.565	44.198	23.988	2.650	24
25	29.344	47.259	52.511	43.692	23.166	3.567	25
26	30.103	47.657	52.441	43.173	22.338	4.483	26
27	30.852	48.039	52.354	42.641	21.503	5.398	27
28	31.591	48.407	52.252	42.097	20.661	6.311	28
29	32.321	48.760	52.134	41.539	19.813	7.221	29
30	33.041	49.098	52.000	40.968	18.959	8.130	30
Deg.	VI° -	VII° -	VIII° -	IX° -	X° -	XI° +	Deg.

# LATITUDE.

## Secular Variation in Longitude.

Argument  $(\text{Long.} * \frac{+ \alpha}{+ \beta})$  and  $(\text{Long.} * \frac{- \alpha}{- \beta})$ .

If the Declination is South change the Sign.							
Deg.	O <sup>s</sup> —	I <sup>s</sup> —	II <sup>s</sup> ±	III <sup>s</sup> +	IV <sup>s</sup> +	V <sup>s</sup> +	Deg.
0	260.00	204.84	94.80	40.65	165.20	245.49	0
1	259.25	201.92	90.50	45.18	168.75	247.11	1
2	258.42	198.94	86.17	49.70	172.25	248.65	2
3	257.52	195.91	81.82	54.20	175.70	250.12	3
4	256.42	192.81	77.44	58.69	179.09	251.51	4
5	255.47	189.66	73.04	63.16	182.43	252.82	5
6	254.33	186.45	68.62	67.61	185.71	254.06	6
7	253.11	183.18	64.17	72.03	188.94	255.22	7
8	251.81	179.85	59.71	76.43	192.11	256.30	8
9	250.44	176.47	55.23	80.82	195.22	257.30	9
10	248.99	173.04	50.73	85.18	198.27	258.22	10
11	247.47	169.55	46.21	89.51	201.26	259.07	11
12	245.87	166.02	41.68	93.82	204.18	259.84	12
13	244.19	162.43	37.14	98.10	207.05	260.52	13
14	242.44	158.79	32.59	102.34	209.85	261.13	14
15	240.62	155.10	28.03	106.56	212.59	261.65	15
16	238.72	151.37	23.46	110.74	215.27	262.11	16
17	236.75	147.59	18.88	114.89	217.87	262.48	17
18	234.71	143.77	14.30	119.01	220.41	262.77	18
19	232.60	139.90	9.71	123.08	222.89	262.98	19
20	230.42	135.98	5.12	127.12	225.30	263.11	20
21	228.16	132.03	0.52	131.13	227.64	263.16	21
22	225.83	128.04	4.08	135.09	229.91	263.13	22
23	223.44	124.01	8.66	139.01	232.11	263.02	23
24	220.98	119.14	13.25	142.89	234.24	262.83	24
25	218.46	115.83	17.84	146.72	236.30	262.55	25
26	215.87	111.69	22.42	150.51	238.28	262.20	26
27	213.21	107.51	26.99	154.26	240.20	261.77	27
28	210.48	103.30	31.55	157.96	242.03	261.26	28
29	207.69	99.06	36.11	161.60	243.80	260.67	29
30	204.84	94.80	40.65	165.20	245.49	260.00	30
Deg.	+ VI	+ VII	+ VIII	- IX	- X	- XI	Deg.

The sum or difference of the two quantities taken from this table by the two arguments, will be the secular variation in longitude, which, when the auxiliary angle  $\beta$  is used, is to be multiplied by 10.

**LATITUDE of a Planet**, is an angle, as PTR (*Platz XVI Astronomy, fig. 148.*) under which a planet's distance from the ecliptic PR is seen on the earth.

The sun never has any latitude, but the planets have; for which reason, in the common sphere, the zodiac has some breadth. The ancients only allowed six degrees on each side the ecliptic, but the moderns have extended it to nine.

When they have no latitude, they are said to be in the nodes of the ecliptic, or in the intersection of their orbit with that of the sun; and in this situation it is that they eclipse, or are eclipsed by, the sun.

**LATITUDE, Circle of**, is a great circle, MST *m*, passing through the poles of the ecliptic. See **CIRCLE**.

**LATITUDE of the Moon, north ascending**, is when she proceeds from the ascending node towards her northern limit, or greatest elongation.

**LATITUDE, North descending**, is when the moon returns from her northern limit to the descending node.

**LATITUDE, South descending**, is when she proceeds from the descending node to her southern limit.

**LATITUDE, South ascending**, is when she returns from her southern limit to her ascending node.

And the same holds good of the other planets. See **ASCENDING and DESCENDING**.

**LATITUDE, Heliocentric, of a Planet**, is its distance from the ecliptic, such as it is seen from the sun.

This, when the planet comes to the same point of its orbit, is always the same, and unchangeable.

**LATITUDE, Geocentric, of a Planet**, is the distance from the planet from the ecliptic, as it is seen from the earth.

This, though the planet be in the same point of its orbit, yet is not constantly the same, but alters according to the position of the earth, in respect to the planet. See **HELIOCENTRIC, and GEOCENTRIC**.

Dr. Halley has some considerations, in the Philosophical Transactions, which make it probable, the latitudes of some of the principal fixed stars, particularly *Polaris*, *Sirius*, and *Arcturus*, alter in time; whence it may be argued, the rest likewise alter, though the variation may be less conspicuous in these, because they are supposed at a greater distance from us. See **STARS**.

**LATITUDE, Difference of**, is an arc of the meridian, or the least distance of the parallels of latitude of two places; and it is found when these have the same name; by subtracting the lesser latitude from the greater; and when they have contrary names, by adding them together.

**LATITUDE, Parallax of**. See **PARALLAX**.

**LATITUDE, Refraction of**. See **REFRACTION**.

**LATITUDINARIAN**, among *Divines*, denotes a person of moderation, with regard to religious opinions, who believes there is a latitude in the road to heaven, which may admit people of different persuasions. This name was given by way of distinction to those excellent persons in England, who, about the middle and towards the close of the 17th century, endeavoured to allay the contests that prevailed between the more violent Episcopals on the one hand, and the more rigid Presbyterians and Independents on the other, with respect to the forms of church government and public worship; and also between the Arminians and Calvinists, with respect to certain religious tenets. Many of them were zealously attached to the forms of ecclesiastical government and worship that were established in the church of England, and they recommended episcopacy with all their eloquence; but they did not consider it as of divine institution, and absolutely necessary to the constitution of a Christian church; and therefore they maintained that those who followed other forms of government and worship were not, on that account,

to be excluded from their communion, or to forfeit the title of brethren. Others had no great liking for the liturgy or ceremonies, or, indeed, the government of this church, but yet, for the sake of peace and order, conformed. As to the doctrinal part of religion, they took the system of the famous Episcopius for their model, and, like him, reduced the fundamental doctrines of Christianity, *i. e.* those doctrines, the belief of which is necessary to salvation, to a few points. By this manner of proceeding they shewed that neither the Episcopals, who, generally speaking, embraced the sentiments of the Arminians, nor the Presbyterians and Independents, who as generally adopted the doctrine of Calvin, had any reason to oppose each other with such bitterness and animosity, since the subjects of their debate were matters of indifference with respect to salvation, and might be variously explained and understood, without any prejudice to their eternal interests.

The chief leaders of these Latitudinarians were Hales and Chillingworth: to them may be added the respectable names of More, Cudworth, Gale, Whitcomb, Wilkins, and Tillotson. The first fruits of their charitable zeal were the odious appellations of *Atheists*, *Deists*, and *Socinians*, liberally bestowed upon them by the Roman Catholics, and the more rigid of the Protestant contending parties. However, they were afterwards raised to the first dignities of the church, and deservedly held in general esteem. And at this time the church of England is chiefly governed by Latitudinarians of this kind; and the spirit of moderation and mutual charity has generally prevailed, with that of liberal enquiry, among the various sects and denominations of Christians. Mosheim's *Ecl. Hist.* vol. iv. and Birch's *Life of Tillotson*, p. 407. See **COMPREHENSION**.

**LATIUM**, in *Ancient Geography*, a considerable division of Italy, which acquired importance from its having given name to the Latins, and from its having Rome for its capital. Some authors have thought that this was a denomination given to the whole of Italy, or at least to a more considerable extent of territory, than that to which it was afterwards restrained. Several of the ancients have sought the etymology of Latium, in the verb *latere*, to conceal, and they have imagined that this name was given to the country, because Saturn retired thither in order to shelter himself from the fury of his children. M. Gêbelin, in his *Oriental Allegories*, suggests, that the primitive *lat* signifies to conceal, and that *terra alio* alludes to the application of the soil, for the concealment of the seed that was sown in it. Hence, he says, Latium might have signified the country where seed was sown, in contradistinction to that part which was mountainous and uncultivated. The ancients distinguished Latium into ancient and modern, and under these appellations it comprehended different territories. Ancient Latium extended from the Tiber to Circeii, and was estimated at 50 miles in length. Its inhabitants, in succession, were the Aborigenes, the Pelasgi, the Arcades, the Siculi, the Arunci, and the Rutuli; and besides these, the Circeii, the Volsci, the Osci, and the Ausones; and by degrees the name Latium extended as far as the river Liris. At the first, says Strabo, the Latins had possession of it, and were not subject to the Romans; but when these had vanquished the Æqui, Volsci, and Hernici, as well as the Rutuli, the Aborigenes, the Roeci, and the Argyrucii, and also the Privenates; the whole country, thus subdued, assumed the name of Latium; and it afterwards extended to Campania, and the country of the Samites. Among the original inhabitants we may reckon the Siculi; and it was afterwards occupied by various tribes, which migrated thither at different periods; being at this time an inconsiderable territory.

tory, along the coast of the Tuscan sea, south of the Tiber. Under the Latin kings, it extended southward to the Promontorium Circæum, as we have already stated, which was 50 miles beyond the Tiber. Under the consular government, the territories of the *Æqui*, *Volsci*, and *Hernici*, were annexed to this province, and the river *Liris* (Gari-gliano) was held to be the southern boundary. At the commencement of the Christian era, *Sinuccia*, now *Sinope*, and the circumjacent territory noted for its baths, were included in *Latium*; so that, in its greatest extent, it comprehended *Campagna di Romagna*, and a considerable part of *Terra di Lavoro*. The principal rivers in this province were the *Tiber* and *Liris*; which see respectively. The chief cities and towns were *Rome*, *Osia*, *Laurentum*, *Lavinium*, *Ardea*, *Tibar* or *Tivoli*, *Tusculum* or *Frescati*, *Gabii*, now extinct, between *Rome* and *Præneste*, *Præneste*, *Alba Longa* or *Albano*, *Aricia* near *Alba Longa*, on the *Apennian* way, &c. See *ITALY*.

**LATMOS**, or **LATMUS**, a mountain of *Asia Minor*, partly in *Ionian* and partly in *Caria*.

**LATMUS**, originally a village of *Asia*, in *Cilicia*, on the banks of a river of the same name, which afterwards became an episcopal town of *Iliaria*. The river had its source in mount *Latmus*, and discharged itself into the *Latic* gulf, near the town *Heraclea*. The *Latic* gulf was a gulf of *Ionian*, which commenced between the mountains *Latmus* and *Grius*, and extended from thence towards the N.W., communicating with another gulf at the mouth of the *Meander*—Also, a small island situated to the S.E. of the *Latic* gulf, near to and W.N.W. of *Heraclea*.

**LATOAN**, in *Geography*, a small island in the East Indian sea, near the N. coast of *Borneo*. N. lat. 7° 16'. E. long. 117° 21'.

**LATOMIA**, Λατομια, derived from the Greek λατ, *flans*, and τμια, *I cut*, properly signifies a quarry, or place where stones are dug. See *QUARRY*.

These were anciently used as goals for criminals. *Dionysius* had a place of this kind dug in a rock near *Syracuse*, where an infinite number of people were shut up. *Cicero* reproaches *Verres* with imprisoning Roman citizens in *latomia*; so that *latomia* became a general name for a prison; so the prisoners inclosed in them were called *latomarii*.

**LATOMIA**, in *Ancient Geography*, the name of six small islands in the Arabian gulf, according to *Strabo*.

**LATONA**, a town of *Egypt*, upon the Nile, which was the capital of a nome called the *Nomos Latopolites*. *Ptolemy*.

**LATONA**, in *Mythology*, a goddess of paganism, whose history is very obscure. *Hesiod* makes her the daughter of *Titan Cœus* and *Phebe*, his sister. The fable adds, that *Apollo* and *Diana* were her offspring by *Jupiter*, and that they advanced her to the rank of celestial deities in spite of *Juno*. According to *Herodotus*, she was an Egyptian deity, the nurse, and not, as the Greeks represented her, the mother of *Apollo* and *Diana*, and was worshipped at *Buto*, or *Buthos*, in *Egypt*. The inhabitants of *Delos* erected a temple for her, pretending that *Neptune*, with a blow of his trident, had made the island of *Delos* to rise up from the bottom of the sea, to secure to *Latona*, persecuted by *Juno*, a place where she might, without molestation, bring forth her children: but that at *Argos* was the most magnificent, and celebrated for her statue, executed by *Praxiteles*. *Latona*, *Venus*, and *Diana*, were the three goddesses most in veneration among the Roman women.

**LATOPOLIS**, in *Ancient Geography*. See *ESNEH*.

**LATOPOLITES NOMOS**, a district of *Egypt*, the capital of which was dedicated to *Latona*, and situated on

the left of the Nile. This nome is mentioned both by *Strabo* and *Pliny*.

**LATOPOLITES NOMOS**, or *Hermionites Nomos*, another district of *Egypt*, the capital of which was called the town of "Latonium," according to *Ptolemy*.

**LATORCZA**, in *Geography*, a river of *Hungary*, which rises near the *Carpathian mountains*, and runs into the *Theiss*, near *Tokay*.

**LATOCHE'S ISLAND**, an island in the North Pacific ocean, at the entrance of *Prince William's sound*, 13 miles long and three broad. N. lat. 60. E. long. 212° 30'.

**LATOVICLI**, in *Ancient Geography*, a people of Upper *Pannonia*.

**LATOUCR**, in *Geography*, a town of *Hindooostan*, in the circuit of *Aurangabad*; 25 miles W. of *Aurangabad*.

**LATOWIC**, a town of the duchy of *Warsaw*; 18 miles E. of *Czerlik*.

**LATRIA**, Λατρία, in *Theology*, a religious worship, due only to *God*.

The *Romanists* say, "They honour *God* with the worship of *latria*; and the saints with the worship of *dulia*;" but the terms, however distinct, are usually confounded.

The worship of *latria*, besides its inner characters, has its external marks to distinguish it; the principal whereof is sacrifice, which cannot be offered to any other but *God* himself, as being a solemn acknowledgment, or recognition, of the sovereignty of *God*, and our dependence on him.

*M. Dailé* seems to own, that some of the fathers of the fourth century allowed the distinction between *latria* and *dulia*. See *ADORATION* and *WORSHIP*.

**LATRIS**, in *Ancient Geography*, a town of *Germany*, at the mouth of the *Vistula*. *Pliny*.

**LATRONICA**, in *Geography*, a town of *Naples*, in *Basilicata*; 22 miles S.W. of *Turi*.

**LATSCHACH**, a town of the duchy of *Carinthia*; 14 miles S.W. of *Clagenfurt*.

**LATTANZIO**, *GAMBARA*, in *Biography*, a painter of history and portraits. He was the son of a taylor at *Cremona*; but being more inclined to painting than the use of the needle, he spent his youthful days in covering the walls and furniture of his father's house with drawings in charcoal, and thus drew upon himself the displeasure of his parents; who evinced their dissatisfaction by the unequivocal testimony of the scourge.

*Giulio Campo*, an artist of some celebrity, residing at *Cremona*, happened one day to pass by when the taylor was exerting his energies upon the back of his self-willed son *Lattanzio*; hearing the cause, he took the boy home with him, and for six years assisted and encouraged him in his pursuit of the art of painting. Such was the success accompanying this act of generosity, that according to *Vasari*, *Gambara* became the best painter of his time in *Brescia*, where he took up his residence; and where many ingenious artists practised painting in conjunction or competition with him.

His principal works are in fresco, and some are still to be seen at *Brescia*, particularly the cloister of *Santa Euphemia*, wherein he painted a series of scriptural and evangelical subjects. *Venice*, *Parma*, and *Cremona* all possess testimonials of his skill, which adorn their churches and many of their private houses. His style is very much like that of *Pordecone*, an attempt to unite the colour of the Venetian with the drawing and design of the Florentine school, but it is not so powerful. He married a daughter of *Romanno*, but died at the early age of 33, by a fall from a scaffold while painting

painting in the church of St. Lorenzo in Brescia, about the year 1570. Ridolfi. Vafari.

LATTIMO, in the *Gloss Trade*, a name for a fine milk-white glass. There are several ways of making it, but the best of all is this: Take four hundred weight of crystal frit, and sixty pounds of calcined tin, and two pounds and a half of prepared manganese; mix these well with the frit, and fet them in a pot in a furnace to melt and refine. At the end of eighteen hours this will be purified; then cast it into water, purify it again afterwards in the furnace, and make a proof of it. If it be too clear, add fifteen pounds more of calcined tin; mix it well with the metal, and let it stand one day to purify; it will then be of a whiteness surpassing even that of snow, and is fit to work into vessels. Neri's Art. of Glass, p. 98. See GLASS.

LATTIN, or LATTEX, a name by which we used to call the plates of iron covered with tin, and now usually called *tin*, of which our mugs, and such other things, are made. The principal part of the work is to prepare the leaves, beat out to a proper thinness, so as that they shall readily receive the tin; for if there be but the smallest particle of dust on them, or only the slightest rust in any part, the tin will never fix there.

This smoothing of the plates is effected by steeping them in acid water, till the surface is a little preyed upon by it, and then they are scowered with sand, which makes them very smooth and fine. By this means a woman cleans more plates in an hour, than the most expert workman can do otherwise in many days. M. Reaumur, to whom the world owes the discovery of this process, mentions several waters, any one of which will succeed, but the Germans themselves use nothing but common water, made eager with rye. This they make a great secret of, but the preparation is very easy. After they have ground the rye grossly, they leave it to ferment in common water for some time; and they are thus sure of a sharp and eager menstrum, excellently fitted for their purpose. With this liquor they fill certain troughs, or tuns, and into these they put several bundles of the plates of iron: and to make the liquor more eager, and to act the better on them, they keep it in stoves, where it has little air, and is kept warm with small charcoal fires.

There are several other ways of making iron rust, as keeping it in a moist cellar, exposing it to the dew, sprinkling it with simple water, or, which is still better, with water in which sal ammoniac has been dissolved, several times a day: and in those countries where the pyrites is common, the vitriolic waters, which partake of it, will do it very well. This water may be prepared at little or no expence, only by heaping up large quantities of the pyrites, and letting it moulder in the air, then putting it into common water, and making a lixivium of it. Whichever method of rusting the plates be used, it is always necessary to scower them with sand as soon as it is done; and when they are thus cleaned, they must be immediately plunged into water, to prevent their rusting again, and they are to be left in this water till the instant in which they are to be tinned, or, in the language of the workmen, *blanched*. The people employed in this part of the operation are called *blanchers*; and the others, who assist at the cleaning of the plates, the *scalers*. The blancher makes as great a secret of his art, as the scaler does of his; and it was with great difficulty that M. Reaumur obtained it. The manner of doing it is this:

They flux the tin in a large iron crucible, which has the figure of an oblong pyramid with four faces, of which two opposite ones are taller than the two others. The crucible is heated only from below, its upper part being luted with the furnace all round. The crucible is always deeper than the

plates, which are to be tinned, are long; they always put them in downright, and the tin ought to swim over them. To this purpose artificers of different trades prepare plates of different shapes, but M. Reaumur thinks them all exceptionable. But the Germans use no sort of preparation of the iron, to make it receive the tin, more than the keeping it always steeped in water till the time; only when the tin is melted in the crucible, they cover it with a layer of a sort of suet, which is usually two inches thick, and the plate must pass through this before it can come to the melted tin. The first use of this covering is to keep the tin from burning; as if any part should take fire, the suet would soon moisten it, and reduce it to its primitive state again. The blanchers say, this suet is a compounded matter. It is indeed of a black colour, but M. Reaumur supposed that to be only an artifice to make it a secret, and that it is only coloured with soot, or the smoke of a chimney; but he found it true so far, that the common unprepared suet was not sufficient; for after several attempts, there was always something wanting to render the success of the operation certain. The whole secret of blanching, therefore, was found to lie in the preparation of this suet; and this he at length discovered to consist only in the first frying and burning it. This simple operation not only gives it the colour, but puts it into a condition to give the iron a disposition to be tinned, which it does surprisingly.

The melted tin must also have a certain degree of heat, for if it is not hot enough, it will not stick to the iron; and if it is too hot, it will cover it with too thin a coat, and the plates will have several colours, as red, blue, and purple; and upon the whole will have a cast of yellow. To prevent this, by knowing when the fire has a proper degree of heat, they might try with small pieces of iron; but, in general, use teaches them to know the degree, and they put in the iron when the tin is at a different standard of heat, according as they would give it a thicker or thinner coat. Sometimes also they give the plates a double layer, as they would have them very thickly covered. This they do by dipping them into the tin, when very hot, the first time, and when less hot, the second. The tin, which is to give the second coat, must be fresh covered with suet, and that with the common suet, not the prepared. Philos. Trans. N<sup>o</sup> 466, p. 634. See TIN.

LATTYPOUR, in *Geography*, a town of Bengal; 20 miles N. of Kithenagur.

LATUS, in *Ichthyology*, the name of a fish of the coracinus, or umbra kind, caught in the Nile, and in the Adriatic and Mediterranean seas. It much resembles the common coracinus, but is larger, and has not the beard which hangs from the chin in that species; and its body is somewhat rounder. It is esteemed a very delicate dish. Rondelet. de Pisc. p. 130.

LATUS, in *Anatomy*, a name given by many authors to one of the muscles of the anus, now generally called the levator ani.

LATUS Rectum, in *Conics*, the same with parameter. See CONIC Sections, and PARAMETER.

LATUS Transversum of the hyperbola, is a right line, intercepted between the vertices of the two opposite sections; or that part of the common axis which is between the vertices of the upper and lower cone. See HYPERBOLA.

LATZKI, in *Geography*, a town of Aultrian Poland, in Galicia; 80 miles W.S.W. of Lemberg.

LAVA. This word, in its strict sense, denotes only the fused stony substance which issues from volcanoes during the time of their activity, and according to the degree of fluidity it has acquired, and the quantity in which it is discharged,

charged, either collects near the crater in amorphous groups, or extends its course to various distances. But much greater latitude (as we shall see hereafter) has been given to the term *lava* by several authors, for not only other volcanic ejections, to which the above definition cannot be applied, have been described under that name, but even such unaltered rocks as will be allowed by unbiassed observers to have scarcely any one character in common with real volcanic productions.

Werner has divided lava into two varieties only; viz. 1. Scorious or slaggy lava (*Schlackige Lava*), and 2. Foamy lava (*Schaumige Lava*.)

The colour of the *scorious lava* is greyish-black, which passes into smoke-grey, yellowish-grey, reddish-grey, greenish-grey, and through several shades of this into greenish-black. Decomposition, sulphuric and other vapours, frequently modify the principal colours, and often produce the lighter tints of yellow.

It occurs more or less knotty and vesicular, with vesicles of different size, sometimes glazed over, and empty. Internal lustre between glimmering and glistening, seldom shining. Fracture imperfectly conchoidal, also fine-grained, uneven. Is commonly opaque, sometimes faintly translucent on the edges. It is semi-hard, brittle, easily frangible, and not particularly heavy.

The colour of the *foamy lava* is generally dark greenish-grey, approaching to greenish-black. Its vesicular structure, brittleness, and lightness are indicated by its name.

This the Wernerian school carefully distinguishes from *pumice*; which see.

Lava is often porphyritic, but the crystals of hornblende, augite, &c. are, according to Werner, wrapped up, not imbedded, in its basis; and when they occur in the hollows or vesicles of lava, are not in the form of druses, but generally part of the crystals projects into the cavity, while the other is included in the lava.

Though the Neptunists profess to find characters sufficiently obvious to distinguish lava from unaltered rocks that might be mistaken for it, such as the rough aspect which it presents both internally and externally, &c.; yet their decision in dubious cases is known to be chiefly regulated by the mode of occurrence of the rock; and substances, that present regular strata, not seldom of very considerable extent and comparative thickness, and frequently conformable to all the sinuosities of the older formations, can never be expected to find a place in their catalogue of volcanic productions.

The question, whether lava ever occurs in a *compact* state, involves the various controversies with regard to the origin of basalt, which will be treated of at large in its proper place. But as it is necessary in this article briefly to advert to the reasons that have induced Werner, and other Neptunists, to exclude compact lava from their systems, we shall extract the excellent observations given on this subject by Mr. Kirwan, in the second appendix to his *Mineralogy*.

“By compact lava,” says this distinguished mineralogist, “volcanic writers denote an earthy substance, which, after having been fused, but not vitrified, becomes, on cooling, compact, close, and solid. Whether this degree of solidity is such as *totally* to exclude that evidently porous and cavernous structure, which cellular lava presents, is not perfectly agreed upon.

“Those who are guided by observation on modern and undisputed volcanic torrents, allow that no lava, absolutely compact and destitute of pores, in an extent of more than

a few square inches, is ever found. Thus Mr. Bergman defines compact lavas to be “those which, though not absolutely destitute of cavities, yet contain so few, that they may be cut into slabs with an almost entire surface, and polished like marble.” (3 *Bergin*. p. 201.) To this definition, Mr. Dolomieu, in his notes on Bergman’s Dissertation, makes no objection; from which we may conclude, that in a small extent, such as that of common marble slabs, they never exhibit an uninterrupted surface. This last mentioned philosopher, indeed, having unfortunately wished to comprehend, in his definition of compact lava, stony masses, not found in modern and undisputed beds of lava, but in *supposed* ancient currents, found himself much embarrassed: There is, says he, such uncertainty in the characters of compact lava, that, independently of local circumstances, the most experienced eye may be deceived. (Iles Poncez, p. 171.) Yet these circumstances, not properly attended to, are those which have seduced him into the most palpable mistakes.

“Gioeni, though in many instances misled by Dolomieu, yet acknowledges that lava, so compact as to be totally destitute of pores, is not found. (Lithol. Vefuv. p. 85). Padre Torre, who, independently of any system, has candidly and impartially examined the products of Vesuvius, expressly denies the existence of lava destitute of pores, none other but the porous being found in currents of modern date. Galeani, in his catalogue of the lavas of Vesuvius, drawn up in 1772, hardly mentions any compact lavas. Gioeni, in his catalogue, entirely omits this distinction; and Mr. Dolomieu acknowledges that not a single specimen of compact lava is to be found in the cabinet of prince Biscari.

“Those, on the other hand, who, guided by system, bestow the name of lava on stony masses, which they *suppose* to have anciently flowed, either from real still subsisting, or imaginary ancient extinct, volcanoes, find *compact* lava entirely destitute of pores, very scarce indeed in the *supposed* currents from modern, but in *great plenty* in those which they ascribe to their fictitious volcanoes now extinct, as well as in the very bowels of those volcanoes.

“Gioeni, after telling us, from Dolomieu, that compact lava occupies the centre of the beds of lava, and porous lava the upper part, acknowledges that this gradation seldom takes place; a few, however, says he, are the visible currents of lava on Vesuvius, in which we meet this gradation.” It seems, he should rather have said, none; for, some lines after, he tells us, that modern volcanoes have lost the power of producing any. (Lith. Vefuv. xlvii.) The detached masses that pass for compact lava, he acknowledges to have been ejected in their solid form by the explosive power of the volcano, and consequently are not real lavas, but rather natural stones, torn from the sides of the mountain. (Lith. Vefuv. li.) Mr. Dolomieu tells us, that compact lavas are stones which, after having been melted, re-assume their natural state and appearance without any change in their external or internal properties, or scarce any change; and that some are perfectly compact (that is, destitute of pores), namely, those that are buried under, not other lavas, but under an entire and immense volcano (De Prod. Volcan. p. 162. Poncez. 170. 179.) ; he, therefore, gives up the idea of finding these not only in the *beds* of modern, but even in those of extinct ancient volcanoes. Hence he tells us, that they are much more common in extinct volcanoes; and that in *Ætna* they do not constitute the  $\frac{1}{10}$  part of the whole; whereas in Vivarais and Auvergne they form whole mountains. Now most of these ancient volcanoes of the Vivarais appear to me and many others, to be mere creatures of imagination, and consequently, until the substances they contain are proved to have been in fusion, no definition, grounded on the appearance

ances of these substances, can pass for that of real compact lava.

"In beds, however, of real undisputed lava, some parts are found, that, having been pressed by the super-incumbent weight, are more compact than common porous lava; and these, comparatively to the former, may be called compact; but scarcely more than a few square inches of their substance is destitute of visible pores.

"Their colour is brown, yellowish, reddish brown, bluish, or black, more rarely grey. Their lustre *o. 1*. Transparency *o. 1*. Their fracture earthy, or fine splintery, more rarely foliated, and presents small internal pores, if of sufficient size, in some part of the substance. Hardness from 7 to 9. Specific gravity 2.75 to 2.88.

"Much circumspection is requisite in framing a description of compact lava, from a view of the specimens brought to us from volcanic countries, as they are all collected by persons, who take indiscriminately from real, and from supposed, volcanic currents, even from mountains in which no volcano ever existed.

"To form a true idea of these lavas we should attend to the following circumstances; 1. That the heat of most volcanoes (I exclude those that for the most part produce only vitrified substances) seldom reaches 100° of Wedgwood; the proof of which is, that almost all real lavas, whether cellular or compact, are vitrifiable at that degree. Since, therefore, they were not vitrified in the volcano, it is plain, that in it they did not attain that degree; 90 or 95 degrees may then be assumed as the average heat of most volcanoes. 2. In this heat many stones of the argillaceous genus, as trapps, hornblendes, and argillites, undergo a change; for they alter their colour, become porous, assume a porcelan grain, and consequently begin to vitrify, as I have found on repeated trials; but they never flow in this heat, nor consequently form a lava; but bitumen will flow in this heat, and even in one much inferior, and be decomposed. If, therefore, the argillaceous stones be mixed with and drenched in bitumen, they will be softened by it, and flow with it; and where the air, erupting both from them and the decomposing bitumen has most liberty to escape, it will tumify, burst through the liquid mass, and form cellular lava; but, where it is more compressed, less of it will be disengaged, and the lava will be compact, and resemble, in some degree, the original stone of which it is formed. 3. Stones of the siliceous genus undergo no change in this heat, nor even shorls or feldspar; and hence, though immersed in the fiery torrent, they cannot with propriety be called lavas, as they are not even softened by the mixture of bitumen, as stones of the argillaceous genus are.

"Between siliceous and argillaceous stones there are many gradations and various mixtures, which must occasion corresponding varieties in the effects which heat and various other circumstances may produce. It is sufficient here to establish the principles on which most of them may be explained. Compact lavas abound in heterogeneous substances which either have not been fused, or only partially fused or scorched, or decomposed by heat, as feldspar, shorls, garnets, zeolites, &c. Every volcano has some that are peculiar to it. Thus the lavas of Vesuvius abound in that called white garnet, and which I call Vesuvian, those of *Ætna* abound in feldspar, &c.

"Hence we must exclude from the rank of lavas all stones which do not appear, either from their external characters or local circumstances, ever to have been softened by heat; and consequently, all those detached pieces which are ejected at the beginning of an eruption without fusion, and many others which volcanic collectors enumerate among compact

lavas, merely from having found them in the vicinity of volcanoes. Thus Mr. Dolomieu (Lipari, p. 85.) reckons among volcanic stones one, in the interior of which he distinctly perceived a leaf of sea-weed. Few indeed are the stones contained in his catalogue which can be deemed really volcanic.

"All real lavas, except those of the vitreous kind, affect the magnetic needle, unless the iron they contain be much oxygenated, as it often is in those of a red colour; but even these are frequently magnetic by reason of the shorls embodied in them.

"The component ingredients of lavas are various, according to the nature of the original stones, and the accidents they meet with in their liquified state. Mr. Dolomieu found them to contain from 40 to 60 per ct. of silica, from 16 to 3 of magnesia, from 5 to 1 of calx, and from 2 to 25 of iron." Poncep, p. 184.

"Though the above, and several other remarks of the same tendency, which will be noticed under the articles TRAPP-FORMATION and VOLCANO, have much contributed to invalidate the testimony of those who contend for the existence of compact lava, and the igneous origin of many other substances apparently Neptunian, yet volcanists continue to classify over and over again those substances which they consider as belonging to their domain; and it is necessary to be acquainted as well with their mode of viewing the subject as with that of the opposite party. It is with this view that we give the following abstract of the most complete arrangement of, so called, volcanic rocks hitherto offered to the world, namely, that of the celebrated Faujas de Saint-Fon, which occupies nearly a whole volume of his "Essai de Géologie," published at Paris in 1809. It is almost superfluous to observe that this arrangement should be consulted *cum grano saltu*; as of course almost all the rocks belonging to the felsit-trapp formation of Werner are introduced into it, as well as other substances, which, although ejected, have probably not undergone any alteration by the agency of the fire, and are therefore to be considered as intruders into an arrangement of lavas.

CLASS I. *Lavas considered with regard to their form and external modifications.*

*Div. 1. Black, homogeneous, massive, compact lava.*—

1. Fine-grained; from Otaheite, Staffa, the neighbourhood of Rome, Darmstadt, the Euganean mountains, Auvergne, &c. 2. *Var.* of a coarse grain, from Meiffner, the vicinity of Göttingen, Hesse Cassel, Rochemaure in Vivarais, &c. 3. *Var.* of a scaly texture; from Stolpe in Meissen, the isle of Bourbon, Mont Meffin in Vivarais, &c.

*Div. 2. Homogeneous compact lava in prisms, with three to nine sides (the latter rare).—*1. Prisms without joints; Staffa, Expally in Vivarais. 2. *Var.* with prisms transversely divided or jointed; at the Pont de la Beaume in Vivarais, &c. 3. *Var.* with jointed prisms, joints concave at one side and convex at the other; Giant's Cauldway, Ireland, left bank of the Volane, &c. 4. *Var.* with prisms laterally compressed; Rochemaure in Vivarais. 5. *Var.* with arched prisms; Staffa, isle of Bourbon.

*Div. 3. Prismatic lava, with edges and planes so regular as to appear the result of crystallization.*—In pyramids of four sides, flattened, &c.; in Auvergne, &c.

*Div. 4. Tabular lava.*—1. *Var.* in thick tables; from Monts Meffin, Coneron, &c. in Vivarais. 2. *Var.* in thin tables; Rochemaure in Vivarais, isle of France, isle of Bourbon.

*Div. 5. Globular lava.*—1. *Var.* in solid balls; from Teneriffe. 2. *Var.* in hollow balls; isle of Bourbon. 3. *Var.* in balls composed of concentric layers; from Vesuvius, Castel-

Castel-Gombeto near Vicenza, Montechio Precalcino, &c. These lavas are the result of a particular kind of decomposition, which takes place in extensive beds of compact basaltic lavas, in which they appear as if implanted. Some globular lavas owe their origin to the joints of basaltic pillars, whose angles and edges decay, while the nucleus remains found, and appears to issue from the prism.

*Div. 6. Tear-shaped lava (lavas en larmes).*—Small oblong masses, imitating more or less the form of tears. They occur from the size of a hazel-nut to that of an egg, often enclosing within their centre the fragment of a foreign body, such as granite, olivine, &c. Found on Vesuvius, in the crater of Mont-Brül, in Vivarais, Auvergne, &c.

#### CLASS II. Porous lava.

*Div. 1. Heavy porous lava.*—1. *Var.* with large oblong pores; from Vesuvius, Etna, Hecla, Vivarais, Auvergne, &c. 2. *Var.* with large irregular pores; in all the above places. 3. *Var.* with pores less large, and generally round; in a partly porous, partly compact lava; from the Meissner in Hesse. 4. *Var.* with small, round, and oblong pores; in a lava remarkable on account of its hollows or depressions, which exhibit a regular structure, and, on being broken, convey the idea of parallelograms of different sizes, arranged side by side, as well externally as on the internal surface of the lava: some of these parallelograms are more than an inch long, and the fourth part of an inch deep. The origin of this lava, which occurs in the isle of Bourbon, is thus explained by M. Hubert:—A great eruption of the volcano of that island gave origin to a vast stream of lava, which in its progress came in contact with a plantation of palm trees. The trees were immediately set on fire; but being soon covered by the lava, combustion ceased, and the wood became converted into charcoal. Incandescence long time continued, afterwards produced in the fibrous wood, thus carbonized, contractions and clefts of a certain regularity. The lava next entering the clefts formed by contraction, and moulding itself over the nucleus of the coal, produced the hollows observable, as often as the coal is purposely detached, or destroyed by some accidental cause. 5. *Var.* of prismatic triangular form, with oblong and irregular pores; from the neighbourhood of Rochefaute, in Vivarais.

*Div. 2. Light porous lava.*—1. With round pores; from Vivarais, Auvergne, isle of Bourbon, Tunis, &c. Desfontaines has gathered at Tunis specimens of such a lava, which the natives apply in the preparation of their woollen stuffs, in preference to the fullers' thistle used in other countries. 2. *Var.* with oblong pores; from Vesuvius, Etna, Hecla, from Vivarais, Auvergne, &c. 3. *Var.* with irregular curved or twisted pores; from Vesuvius, the isle of Bourbon, Teneriffe, Stromboli, Vulcano, Vivarais, &c. 4. *Var.* with decussated pores; from the isle of Bourbon, Vesuvius, &c. 5. *Var.* with streaked pores; from Vesuvius, Etna, isle of Bourbon, and Mount Hecla.

The light striated lavas, appearing in the shape of cables, ribbands, &c. also belong to this class. In general, the porous lavas are nothing but the result of the more or less active or continued development of gases produced by the peculiar nature of the lavas, and by the more or less violent action of subterranean fire.

#### CLASS III. Scarified lavas.

A particular modification of porous lavas, produced when, under certain circumstances, the matter of which these consist undergoes the first degrees of vitrification, and becomes covered with a kind of shining varnish, which distinguishes them from ordinary porous lavas. These scarified lavas are found, 1, twisted; 2, cable-shaped; 3, ribband-shaped; 4, in bunches, with round or oblong grains; 5, lalacritical,

short elongated knobs, separated or united. All these varieties of forms are found at Vesuvius, Etna, Hecla, in Teneriffe, the isle of Bourbon, &c.

CLASS IV. Lavas considered with regard to their component parts, or to the different rocks from which they originated.

*Div. 1. Granitoid lava.*—These lavas, which, according to Faujas' system, must have been elaborated at a great depth in the bowels of the earth, owe their origin to rocks analogous to our granite, except that quartz does not enter into their composition; the substance formerly considered by Faujas and others as quartz, having proved to be feldspar.

*A. Coarse-grained granitoid lava.*—1. With base of a whitish-grey colour, composed of irregular whitish grains of feldspar, of a quartz appearance, but easily fused before the blowpipe; a great number of minute, thin, and hexagonal laminae of black mica, disseminated among the grains of feldspar, and large crystals of this substance, of a pearly white and parallelipipedic form, are imbedded in this quartz-fs granite. The grains of feldspar have suffered a little by the fire, and the crystals are slightly calcined. Some of them are even dissolved into capillary separations, and pass into a substance like pumice. This lava, which is strongly attracted by the magnet, is found at Mont-d'Or; but a similar variety occurs in the isles of Ponza and Lipari; at Santa Fiora, in Tuscany, &c. 2. *Var.* with base of whitish granular feldspar, spotted with dots of black mica, and hornblende of the same colour, and in small crystals with dull surface; from the Euganean hills, &c. 3. *Var.* with large laminae of a shining bronze coloured mica, some of more than an inch in diameter, in a rough uneven purplish black mass, which is melted without being glassy, and is pervaded by large pores. It is slightly attracted by the magnet. Found near Andernach. 4. *Var.* with base of reddish granular feldspar streaked like pumice, and of white slightly calcined feldspar crystals, with some hexagonal laminae of brown mica, minute reddish garnets, which are partly fused, and a black glassy substance appearing to be hornblende: it is faintly attracted by the magnet. From Santa Fiora, in Tuscany. 5. *Var.* with base of white feldspar, in irregular rather scaly grains, with a great quantity of needles of black hornblende, and altered garnets of a purplish hue. Very obedient to the magnet. From Teneriffe. 6. *Var.* of a white colour inclining to grey, composed of a multitude of very small and close grains of white feldspar; and of much larger grains of shining scaly feldspar, with rather pearly lustre, some of which grains show a tendency to crystallization. Blackish, dull dots, being common hornblende altered by the fire, are disseminated in the feldspar. Faujas mentions a specimen of this variety, from the Cantal, which is traversed by a bar of black and white granite, formed of small grains of very pure feldspar, and of small grains of black hornblende, unaltered by the action of the fire. 7. *Var.* with bluish-black base, having small brilliant points proceeding from the scaly particles of a white stony substance, with dull fracture; purplish red, semi-transparent garnets, partly flaved, partly fused, are indistinctly imbedded both in the black and white substances. The former of these, which is compact, and fuses before the blowpipe into a black glass, has all the characters of hornblende; the latter is compact feldspar. From the Cape de Gatte, in Spain.

*B. Fine-grained granitoid lava.*—8. *Var.* formed by a mixture of small, irregular, close grains of hornblende, and small grains and scales of white, rather pearly feldspar. The hornblende being predominant in this mass, it exhibits a black surface on being broken, or cut by a saw, in which case it resembles basalt; but when polished, small white dots and lines appear, which, though delicate, are still sufficiently visible on the

the black ground of the maf; found on the fummit of mount Mezin, where, by the action of the atmofphere, it undergoes a ftriking alteration; for while the particles of feldfpar at the furface become corroded and difappear, the hornblende remains unaltered and fresh, projecting over the reft as black granular particles. Lavas fimilar to this, fome of them prifmatic, Mr. Faujas pretends to have feen in the neighbourhood of Caffel, and near Gottingen. 9. *Var.* compofed of white feldfpar in fmall grains, rather mealy at the furface, and of a black fubftance diffeminated as dots in the maf; the latter appears to be altered hornblende. In this mixture are alfo imbedded large white feldfpar cryftals with pearly luftre. Occurs on the right bank of the Rhine, at the foot of the Seven Mountains, nearly oppofite Goderberg. 10. *Var.* with white grains of feldfpar, harder, frefter, and of clofer texture than thofe of the preceding variety, mixed with black hornblende, difpofed in dots, lineaments, and even as fmall prifmatic cryftals, more abundant, and lefs altered, than the hornblende of No. 9. Alfo garnet cryftals are diffeminated in it, but cannot be feen without the affiftance of a high magnifier. This variety is attracted by the magnet. It takes a good polifh, and is ufed for building. It is, together with the preceding, found at the foot of the Seven Mountains, where it is quarried. Large feldfpar cryftals have not been found in it. 11. *Var.* compofed of fmall irregular white cryftals, difpofed in diftinct lines appearing fealy, fhining, and as rather calcined when viewed through a lens; their length is about  $\frac{1}{4}$ th, their width  $\frac{1}{8}$ th of an inch; they are interfected by other prifmatic indeterminate cryftals of the fame dimenfions, of an intenf black colour, vitreous, almoft metallic external luftre, but rather dull on the furface of fracture. Alfo particles of iron mica, (for oligifte of Haüy,) and of magnetic iron-ftone, are found in this maf. Faujas has analyzed thefe two ores of iron; according to him they are combined with titanium, and the white cryftals belong to the fpecies of the latter, called *Sphene* or *Titane filiceo-calcaire*. This variety was found, in infulated blocks, near the top of the Meffier, in Heflia. 12. *Var.* differing from the preceding only by the *fer oligifte* it contains being in large laminae, marked with lines, the general difpofition of which produces fmall hexahedral laminae. The fphene, which forms the bafe of this maf, is harder, white, inclining to yellowifh; it confifts of cryftalline tranflucent particles; the magnetic iron interfects the fphene in all direftions, while the iron-mica is only diffeminated here and there; both thefe iron ores are, like the preceding, combined with titanium. This variety is found near the extinct volcano of Beaulieu, in the ci-devant Provence. Mr. Faujas remarks, that no fimilar rock is known to occur, that may be confidered as the original of this, and the preceding volcanic fubftances. He denominates them *granitic*, becaufe they have much the appearance of fuch a compound.

C. *Schiftfe granitoid lava*.—13. *Var.* compofed of minute, reddifh-brown grains of feldfpar, much larger, angular grains of white feldfpar, and a great quantity of fmall fix-fided laminae of fhining mica, difpofed in a fimilar manner as in gneifs. The white feldfpar is eafily feparated into laminae in the direftion of parallel lines observable on it, and which are produced by the action of the fire. Sometimes fome dots of hornblende are feen in the maf; but they are of rare occurrence. This is found in Lipari under the pumice defcribed by Dolomieu. 14. *Var.* with yellowifh-grey, granular, dull feldfpar, intermixed with white vitreous grains of feldfpar, and much black hornblende in fmall, fender cryftals, difpofed in horizontal lines, representing thin layers, and giving this fubftance a fillic appearance. From Vulcano.

CLASS V. *Porphyroid lava.*

Faujas' volcanic porphyries are compofed of a fufible pafte or bafe, in which more or lefs regular cryftals of feldfpar are imbedded, often accompanied by grains of quartz, hornblende, augite, &c. The bafe itfelf be confiders analogous to the "trapps of the Swedes." He fubdivides them as follows.

A. *Porphyroid lava with feldfpar cryftals*.—1. *Var.* with black, hard, and heavy, though rather porous, bafe, and with white feldfpar cryftals of loofe texture. Strongly attracted by the magnet. From mount Etna. 2. *Var.* with more compact bafe, of a deep violet brown colour, with a great quantity of fmall greyifh-white, rhomboidal, and parallelpipedic cryftals, and alfo grains of feldfpar. It is very magnetic, and takes a good polifh. Found by Dolomieu in the Ifle des Salenes, near the village Amalfi, where, according to this geologift, it appears in the form of iflets of flairs. Faujas adds that a fimilar rock is found in Auvergne, in thin tables, which are ufed in fome villages for roofing. 3. *Var.* with purplifh brown bafe, including white irregular feldfpar cryftals, without luftre. From Trizac, in the canton of Mauriac, Auvergne. 4. *Var.* with rather purplifh bafe, abounding with more or lefs regular feldfpar cryftals of a white colour. Though rather decompofed, it affects the magnetic needle. From Mauriac and fome other parts of Auvergne.

B. *Porphyroid lava with feldfpar and mica*.—5. *Var.* with rather purplifh grey bafe, very white irregular feldfpar cryftals, and fmall fometimes fix-fided laminae of an intenf black mica. It fometimes contains fmall cryftals of filiceo-calcareous titanium. From Leorens, part of the Cantal mountains. The bafe of this has quite a compact feldfpar appearance. 6. *Var.* with grey bafe, including white feldfpar cryftals and black mica, but lefs abundant than in the preceding. From Mont d'Or; occurs alfo in the ifles of Ponza and Lipari, &c.

C. *Porphyroid lava with feldfpar and pyroxene*.—7. *Var.* of a deep grey bafe, with dots, lineaments and cryftals of white feldfpar and black pyroxene, in fmall cryftals. Sufceptible of a good polifh. From the extinct volcanoes of Campania, the neighbourhood of Rome, Santa Fiora, &c.

D. *Porphyroid lava with cryftals of black pyroxene and fmall grains of green pyroxene*.—8. *Var.* with deep grey, containing a great number of cryftals of black pyroxene, and irregular dots of greenifh pyroxene. From Chimborazo, where it was found by Humboldt at the height of 1840 toifes. Faujas fo completely miftakes Humboldt, that he imagines the ftratum of this fubftance has 1840 toifes in thicknefs! The fame is found near Puzzuoli; and in the ancient lavas of Vefuvius. 9. *Var.* with the fame bafe as the preceding, and, like it, fufceptible of taking a good polifh. with angular grains, needles, and regular cryftals of green pyroxene. Found among the ancient lavas of Vefuvius.

E. *Porphyroid lava with hornblende and feldfpar*.—10. *Var.* with purplifh bafe, with a profufion of lineaments and more or lefs regular cryftals of black hornblende, irregular grains of white feldfpar, fome of which have penetrated into the hornblende cryftal. Found at Santa Fiora in Tufcany.

F. *Porphyroid lava with hornblende only*.—11. *Var.* of a blackifh-grey colour, with large cryftals of very black and fhining hornblende. From Mas de Puffanton, near Chamerae, in Vivara's. 12. *Var.* of deep reddifh-brown colour, with a profufion of brilliant needles and cryftals of hornblende. From the Peak of Teneriffe.

G. *Porphyroid lava with hornblende and olivine*.—13. *Var.* in which the hornblende, in irregular fragments, conftitutes

more than double the weight of the mafs, in which fome pores are obfervable. The grains of olivine which it includes are iridicent. From the Peak of Teneriffe.

H. *Porphyroid lava with leucite cryftals.*—14. *Var.* with opaque white leucites, with rather pearly luftre, the largelt of which have from three to five lines in diameter; they exhibit, when pieces of the lava are cut and polished, minute rents. The bafe in which they are imbedded is black, compact, hard, very obedient to the magnet, fufible before the blowpipe into a black, opaque glafs; it takes a fine polifh. From Capo di Bove, Caprarola, and the neighbourhood of Naples. 15. *Var.* with large leucites of a dull white colour, fome of them transparent, lamellar, and here and there fufed and vitrified. The enveloping lava is of a greyifh-black colour; it is dry, rough to the feel, full of irregular pores, and attracted by the magnet. From the ancient lavas of Veluvius. 16. *Var.* with white, opaque, dull cryftals, which, though they are fo friable as to be eafily reduced to powder by the preffure of the nail, have ftill preferved their original form; they are large and clofely grouped together. The lava which includes them is of a dull black colour, inclining to grey; it has loft part of its hardnefs, but ftill affects the magnet. In the midft of thefe decompofed cryftals are feen black lineaments and grains of a fubftance which appears to be that of the lava itfelf, and which was perhaps forcibly introduced into the body of the cryftals, through the rents that were produced when the mafs was ftill in a fluid ftate. Found in abundance in the vicinity of Viterbo. 17. *Var.* with white opaque leucites, having fome black points in their centre, and with irregular cryftals of black pyroxene diffeminated in the lava. It is black, hard, fufceptible of a good polifh, attracted by the magnet, and fufible into a black brilliant glafs. Found in large mafles, and fometimes in prifms, at Bolfena. A fimilar variety occurs at Civita-Caftellana, and another at Aquapendente, which latter, however, includes pyroxenes of a yellowifh-green colour. 18. *Var.* with transparent, hard, leucite cryftals, of a yellowifh-white colour, accompanied with black hornblende. The including lava is black, compact, hard, and attracted by the magnet. Found at Borghetto, Bolfena, Aquapendente, and Albano. 19. *Var.* with very fmall white opaque leucite cryftals, clofely grouped together, and accompanied by much larger, irregular cryftals of black hornblende; in a black, hard, compact and very magnetic lava, from Tivoli and Aquapendente. 20. *Var.* with almoft microfopic white, tranflucent leucite cryftals, fo clofely grouped together as to appear to be in contact with each other, intermixed with irregular black hornblende cryftals. Found abundantly at Bolfena, in the neighbourhood of Civita-Caftellana and of Viterbo. 21. *Var.* with very fmall, pellucid, white, leucite cryftals, and irregular hornblende cryftals, of a greenifh colour. In a purplifh, not very hard, lava, the iron of which has acquired a degree of oxydation, whence it fhews no effect on the magnetic needle. From Viterbo. 22. *Var.* with large, white, pellucid leucite cryftals, which are generally of a fealy nature and full of minute flaws, and fometimes with fmall lineaments of a very beautiful fky-blue colour, of a cryftalline appearance. This fubftance, comparable to blue fapphire, or, more aptly, to lazulite, appears to be of contemporary formation with the reft. The fame fubftance in minute particles is difcriminated alfo in the pafte of the lava, which is compact and of a blackifh-grey colour. Befides thefe, alfo black fhining dots are obfervable in this lava; they have the appearance of having been fufed, and may perhaps be grains of pyroxene, or black garnets. Some grains of arfenical pyrites are likewife obfervable in it. From Albano. Some-

times the leucite cryftals, in the lavas of this divifion, are accompanied by fome mica in fmall fcales; and in the neighbourhood of Rome large nodules are found, fometimes of the thicknefs of a man's fist, and entirely compofed of black cryftallized mica and leucite; the latter are clofely enveloped by the former, and both appear to have acquired their cryftalline form at the fame period. This is not confidered by Faujas as a true volcanic fubftance.

#### CLASS VI. *Variolitic lavas.*

The pafte is the fame as that of the porphyritic lavas, but inftead of cryftals, it includes globules of feldfpar.

1. *Var.* with pafte of a greenifh-grey colour, with numerous blackifh-grey globules, of the fize of a pea, and of a finer and harder texture than the bafe; both of them fufible. When the pafte is decompofed by the action of the atmofphere, the round fhots exhibit themfelves as projecting globules. From Teneriffe. 2. *Var.* with grey pafte, and very fmall round fhots of a darker grey colour. This variety, which attracts the magnet, is, like the preceding, compact, and takes a fine polifh. It has a tendency to feparate into thin laminae when ftruck with a hammer. From Veldrine, in Auvergne. 3. *Var.* with grey pafte, inclining to greenifh; fhots like thofe of No. 1, but four times fmaller. Is ftroingly attracted by the magnet. From Pui en Velai. 4. *Var.* with white orbicular fhots on a grey ground; attracted by the magnet. From Pas-de-Compain, Auvergne. 5. *Var.* like No. 4, but with much fmaller fhots, grouped clofer together, and lefs regularly orbicular. From Puy-Creux, Auvergne. 6. *Var.* of a blueifh colour, with very fmall pores, and numerous white orbicular fhots of about two lines in diameter. From the crater of Mon-Brûl, in Vivarais, where it often occurs in large irregular balls, which feparate into concentric layers when ftruck with a hammer.

#### CLASS VII. *Feldfpar lavas; or lavas with bafe of compafä feldfpar.*

Faujas remarks, after Dolomieu, that there are fometimes in the fame lava two different kinds of feldfpar, one of which is compact and fufible, and ferves as bafe to the other, which is more or lefs regularly cryftallized and refractory, fo that the bafe may have been in complete fufion, while the cryftals remained in their original ftate.

1. *Var.* Feldfpar lava of a black colour, opaque, of a very fine grain and conchoidal fracture; it fufes into a white tranflucent glafs, and is ftroingly attracted by the magnet. From Catajo in the Euganean mountains, and from Vulcano. 2. *Var.* of a light grey colour, inclining to fleft red, of a fine grain, tranflucent at the edges; fufible before the blowpipe, and faintly attracted by the magnet. From one of the Ponzaifles. 3. *Var.* of a white colour, heavy, partly vitrified. From the Euganean mountains. 4. *Var.* of the fame colour, but fhining; rather glaffy; compofed of fmall, rather ftreaked, and fometimes fwelled fcales; and, therefore, lighter than the preceding. Is not attracted by the magnet; but is fufible before the blowpipe. From Milo, an ifland in the Archipelago. 5. *Var.* of greyifh-white colour, here and there with a flight fhade of red, with numerous fhining fcales of mica; feldfpar rather calcined. Is not attracted by the magnet; but fufible into a femi-transparent glafs. From the ifle of Ponza, and from Puy-de-Dôme, in Auvergne. 6. *Var.* white, with fcales of brown fhining mica, and pellucid grains of feldfpar, more cryftalline than the bafe in which they are included. From Mont d'Or, in Auvergne; fimilar varieties are found in the Euganean mountain, and another from Mont Mezin, in Velai.

#### CLASS VIII. *Amygdaloid lavas, with bafe of trap.*

These are confidered, by Faujas, as having originally belonged

longed to rocks, whose base is generally the same as that of the porphyries; and whose globules and nodules of calcareous spar, zeolite, calcedony, &c. do not owe their existence as such, to infiltration, but are of a contemporaneous origin with the base. The volcanic fire which operated on such amygdaloid rocks, though it has rendered them soft and fluid, has but little changed their character; but all, in the opinion of that strenuous volcanist, bear clearly the stamp of igneous origin. They are subdivided as follows:

*A. Amygdaloid lava with calcareous globules.*—1. *Var.* with globules of translucent calcareous spar of a yellowish colour, of the size of a pea; in a black, compact mass; attracted by the magnet. From Vivarais; also from Vicenza. 2. *Var.* with white, translucent, sparholc globules, some with a thin, shining, reddish-brown, others with a steel-grey coating of the same kind, in a similar mass, affecting a triangular-prismatic form. From near Rochefave, in Vivarais. 3. *Var.* with white, compact, lenticular grains, translucent on the edges, the largest of them of the size of a common lentil; in a black compact mass, of a very fine grain. From the Isle of Ascension. 4. *Var.* with white, spherical globules; sometimes two, three, or four of them together; sometimes single in cells that are partly empty; base like that of the preceding variety. From the valley of Ronca, in the Veronese territory. 5. *Var.* with similar, very small globules, grouped closely together, and taking up the whole of the cell; in a reddish-brown, hard, compact mass, attracted by the magnet. From the same place. 6. *Var.* with small, perfectly orbicular, globules of equal size, in a deep-grey, compact, soft mass, containing numerous grains of olivine, with oxidized ochrey surface. From Vivarais. 7. *Var.* with white, translucent, shining, radiated globules of arragonite; in a black, hard, compact lava; obedient to the magnet. From the Isle of Ascension. A similar one, but with larger globules, from near Roche-Sauve, in Vivarais. 8. *Var.* with the same globules, but accompanied by grains and indeterminate crystals of black hornblende; in a brownish compact mass. From near Bais, in Vivarais. 9. *Var.* with radiated globules, and irregular grains of arragonite, intermixed with grains of olivine. From the Isle of Bourbon.

*B. Amygdaloid lava with globules of mesotype.*—1. *Var.* with solid globules of a white silky zeolite, composed of needles radiating from the centre; in a black, compact, hard mass, attracted by the magnet; including also grains of black hornblende. Between Roche-Maure and Meyffe, in Vivarais. A similar variety from Staffa, and the Isle of Mull. 2. *Var.* with very small solid globules, of a snow-white zeolite, and irregular, almost microscopic grains of the same substance, so numerous as to constitute half of the whole mass; the base like that of the preceding variety. From the valley of Ronca, in the Veronese territory. A similar one is found near Rome, in which grains of hornblende are lodged in the very substance of the zeolite. 3. *Var.* with numerous, white, pellucid, zeolitic grains, of about the size of a millet seed, and closely grouped together; in a greyish-black compact lava. From Montecchio-Maggiore, near Vicenza. Similar varieties occur in the Lipari islands, at mount Vesuvius, &c.

*C. Amygdaloid lava with stilbite.*—1. With globules of white nearly stilbite, in a black compact base, attracted by the magnet. From Feroc. 2. *Var.* with similar globules, surrounded by a crust of a green, rather friable, substance, very like the green earth of Verona; in a greyish-green mass, not attracted by the magnet. From Feroc. 3. *Var.* with white radiated stilbite, on crystals of calcareous spar; in a black mass. From Iceland. 4. *Var.* with white stilbite,

in indeterminate-shaped nodules, in a friable, brownish mass. From Dumbarton.

*D. Amygdaloid lava with analcime.*—1. With irregular globules of transparent analcime, partly crystallized; in a greyish-black lava, attracted by the magnet. From Mount Etna. 2. *Var.* with oblong globules of pellucid analcime; in a black compact lava, strongly attracted by the magnet. From one of the Cyclopean isles. 3. *Var.* with globules of white compact analcime; in a greyish-black lava, appearing rather altered. From Montecchio-Maggiore. 4. *Var.* with hollow nodules of white, dull, and opaque analcime, partly in the form of trapezoidal crystals; in an altered lava, as it is called by our author. From Dumbarton, Scotland. 5. *Var.* with small, insulated, semi-transparent, greyish, dodecahedral crystals; in a light grey lava resembling tripoli, and penetrated in all parts by numerous, very small, spherical grains of analcime, of a darker grey colour, and a little translucent on the edges; intermixed also with some small crystals of calcareous spar.

*E. Amygdaloid lava, with farsolite,* (referred by Häuy to analcime).—1. *Var.* with globules, and sometimes irregular nodules, of a reddish stony substance, similar to the farsolite of Thompson; in a greyish, hard, porous, but heavy lava; the red globules accompanied by analcime, white radiated zeolite, cuboid crystals of calcareous spar. From Montecchio-Maggiore. 2. *Var.* with radiated zeolite, trapezoidal analcime, cuboid calcareous spar, and semi-transparent crystalline celestine, or sulphat of strontian, of a light blue colour, passing, in some specimens, into white. In a similar mass, from the same place.

*F. Amygdaloid lava, with chabafie.*—1. White chabafie, in a porous, black, heavy mass, with small, blueish, elevated, rather mamillary spots, which are phosphate of iron. From Val di Noto. A similar substance is found at Clermont, in Auvergne. 2. *Var.* with small primitive crystals of chabafie, in the orbicular hollows of a black, hard, heavy, and compact mass. From the Peak of Teneriffe. 3. *Var.* with small globules, and very minute crystals of chabafie, in a black heavy mass, with shining black hornblende, and numerous grains of olivine, decomposed into a yellowish earthy substance. From Teneriffe. 4. *Var.* with primitive crystals of chabafie, lining the orbicular hollows of a close black lava. From Iceland.

*G. Amygdaloid lava, with calcedony.*—Here M. Faujas mentions eleven varieties of nodules of calcedony, some of them containing water, (known by the name of chydrous,) others solid; found principally in the decomposed lavas of Monte Tondo, Monte Galdo, San Florianio, Mont-Main, in the Vicentine territory. To these he adds, by way of appendix, some calcedonic and quartz substances, which he considers as owing their origin to infiltration, and to which he refers the hyalite of Francfort on the Mayne. In another appendix the same author places the masses including the granular peridot or olivine, and which he would consider of porphyritic origin, were the olivines ever found crystallized in them. He enumerates several varieties found in the basalts and lavas of Vivarais, Cassel, Isle of Bourbon.

#### CLASS IX. Volcanic breccias and tuffes.

*A. Volcanic breccias formed of more or less rounded fragments of different kinds of lavas,* seized and enveloped by other lavas in a state of fusion.—1. *Var.* composed of angular and blunt fragments of black, hard, compact lava, of rather porous black lava, and of grains of white feldspar; the whole intimately united by a brownish lava, with streaked pores. Peak of St. Michael, in Velay; as also near Roche Sauve, in Vivarais. 2. *Var.* with irregular fragments of scoriiform semi-vitreous lavas of a shining black colour, cemented by a

grey striated lava, approaching hard pumice. From Vivarais, and the Isle of Lipari. 3. *Var.* formed of numerous angular fragments of black porous lava, and some white opaque feldspar, cemented together by grey pumice with small pores: from Lipari and Ischia. 4. *Var.* with fragments of white, sometimes yellow and brownish lime-stone, in a grey hard lava, mixed with white, transparent, flawed crystals and grains of feldspar, some laminae of black hornblende, silvery mica, and grains of green augite; from the vicinity of Albano, and other parts of the Roman territory. 5. *Var.* composed of large fragments of white marble, fine-grained yellowish marble, and another hard stony substance formed of lime and silice: in a grey lava, including much black pyroxene; from the vicinity of Rome, and from near Vesuvius. 6. *Var.* composed of fragments of white and grey marble, and rounded pieces of black hornblende; others of black scaly mica; in a grey lava, mixed with particles of silvery mica, and numerous fragments of deep green pyroxene. From Ischia. 7. *Var.* with large nodules of olivine, of different colours; fragments of black compact lava, of porous, almost scoriated lava, of the same colour, cemented by a grey mass formed of more or less comminuted detritus of several kinds of lava. From the Isle of Bourbon, of Ascension, &c.

B. *Volcanic breccias formed by the sudden contact of fire and of water greatly heated.*—1. Breccia formed of fragments of brown porphyry, porphyry with red base, and crystals of white feldspar; of fragments of white marble, marked at their points of contact with the lava, with black lineaments that appear produced by an aqueous solution which intimately united all parts of this breccia, the base of which is a grey lava, mixed with melted grains of black pyroxene; it is attracted by the magnet. From the foot of Mount Etna. 2. *Var.* including angular fragments of black lava, with conchoidal fracture; of grey feldspar lava, with rough surface (both attracted by the magnet); of glassy blueish-green lava, fragments of ash-grey pumice, fragments of a whitish, semi-transparent, volcanic glass, and a colourless glass; the whole cemented by a blueish-grey, softish, coarse-grained lava. From the Lipari islands. 3. *Var.* composed of fragments of black, rather porous, basalt, including grains of olivine, of large fragments of a yellowish quartz sand-stone with red stripes, of fragments of grey or red indurated marble, and geodes of brown iron-stone; the whole cemented together by a grey lava, composed of the more or less comminuted grains of the substances that form the breccia, and of some black pyroxene. From the Habichtswald. 4. *Var.* composed of various fragments of black basaltic lava, intimately connected by white and shining calcareous spar, sufficiently hard to allow the breccia to be cut and polished; sometimes the compact lava adopts the reddish colour of ochre. From Roche-maure, Vivarais; also from Monte-Bolca. 5. *Var.* formed of more or less large fragments of intensely black, shining, volcanic glass, cemented by white calcareous spar, susceptible of a good polish. From Val di Noto. 6. *Var.* composed of very small fragments of a compact, greenish-black, decomposed lava, some of which include grains of black pyroxene; in a hard siliceo-calcareous paste, which is but little soluble in nitric acid.

C. *Volcanic tuffas, properly so called,* formed by the detritus of different species of granular, pulverulent, or earthy lavas. They appear to owe their origin to various circumstances. First, they may, according to Faujas, be considered as the result of the sudden contact of water with volcanic fire; when, at the time of great subterranean convulsions, a communication is suddenly opened between the sea and the igneous gulf. Secondly, the projected pulverulent lavas,

which are sometimes carried to a great distance, such as those which buried Herculaneum and Pompei, or those which accumulate at the bottom of the sea in the vicinity of volcanoes, and may, in the progress of time, produce depositions, and even more or less regular strata, of tuffa. Lastly, under some circumstances, the tuffas that were already deposited in the sea, may have been again displaced by currents, and mixed with shells and other marine productions, and sometimes even with land productions, swept into the sea by rivers, &c. the current may, at different intervals, have deposited these tuffas, as more or less regular layers.

1. Volcanic tuffa, composed of white and grey, very light pumice, in small fragments, adhering to each other. From Pleyth, near Andernach, where it covers the quarries of trafs. 2. *Var.* with base of pumice reduced to so fine a powder, as to appear like a clayey substance, serving as a cement to numerous grains of a very light pumice, but less rough to the touch than that of the base, which, moreover, includes small nodules of real porous lava, of a brown colour, and sometimes colourless. From the same place, where it forms a kind of trafs. 3. *Var.* formed of pumice in grains, and small angular fragments of black basaltic lava, scaly particles of a somewhat micaceous schistus, cemented by a paste of pumice reduced to powder. From the same place; where it forms another variety of trafs, being of greater solidity, and forming beds of upwards of fifty feet thickness, in which sometimes charred wood is found. 4. *Var.* formed of very small grains of lava, which is partly scoriated, of some grains of black pyroxene, and other grains of rounded yellowish olivine, cemented by grey and black pulverulent lava, resembling sand-stone. Is sometimes found in beds at Carlberg, in Hesse. A similar tuffa, of a dark grey colour, with white points, is found on an elevated part of the Cantal, in Auvergne. 5. *Var.* of a purplish-grey colour, and resembling, at first sight, a sand-stone, but in reality composed of the detritus of a purplish lava, of a less altered compact lava, and some grains of black pyroxene. Near Roche-sauve, in Vivarais, where it forms thick beds, resting on other tuffas, and overlaid by basalt. 6. *Var.* gold yellow, dotted with white, grey, and black, composed of small fragments of basalt, yellowish-brown friable lava, some grains of olivine, and small particles of black pyroxene; also yellow ochre nodules are found in it. This tuffa forms considerable beds, one above the other, at Roche-sauve, in Vivarais. 7. *Var.* of a purplish-brown colour, with yellow ochre, white and blackish dots, composed of small angular fragments of black compact lava, which has lost some of its hardness; of small fragments of a white marble, mixed with some iron; of particles of porous altered lavas of an ochre-yellow colour; of grains of shining black pyroxene, and some olivine in grains. It is attracted by the magnet. Found at the preceding place, where it forms considerable strata, overlaid by vast basaltic causeways. Also, in this tuffa large nodules of ochre are found. The tuffas of the vicinity of Roche-maure, in Vivarais, are similar to this; as likewise those of the neighbourhood of Rome, of Naples, Campania, of the Euganean mountains, of several parts of the Vicentine territory, &c.

M. Faujas enumerates, at the end of this section, the various animal and vegetable substances, shells, madrepores, and carbonized species of wood, that have been found imbedded in volcanic tuffas. A section is also set apart to volcanic pitch-stones, divided into three classes, *viz.* wood, converted into pitchstein, by volcanic fire; flint, which has undergone the same change; and porphyries converted into what Werner calls pitchstone porphyry. The places assigned to the first of these varieties are, Afferstein, near Frankfurt, and

and Upper Hungary; the locality of the second is principally Auvergne; which is also that of the specimens of volcanic pichstone porphyry, here enumerated. To the last of these substances Faujas refers most of such *laves résinites*, or *résinitiformes* of Dolomieu, as contain crystals of feldspar, and several of which are found at Vulcano. These are said to form a transition into

CLASS X. *Enamels (émaux), obsidians, and other volcanic glasses*.—The prototypes of these are the different varieties of trapp, compact feldspar, and porphyry, which, according as they are more or less fusible by volcanic fire, are, under circumstances favourable to vitrification, converted into the several kinds of glasses that are found among volcanic productions.

A *Enamel*.—1. Grey, with greyish-white, or greenish zones, opaque; some pores are visible in the paste, and, with the help of a lens, also crystals of feldspar, or traces of them. From the isle of Ascension. 2. *Var.* of dark-grey colour, besprinkled all over with small round spots of a much lighter grey, and produced by small globules in the substance of the enamel, which, in some places, displays an intense, vivid-black colour. This substance, which is from the island of Vulcano, bears distinctly the characters of a variolitic lava converted into enamel. 3. *Var.* of a blackish-grey colour, hard, opaque, in which some dots of fused black pyroxene are still visible. From the isle of Ponza. 4. *Var.* of an intense black colour, approaching obsidian, but more opaque, and of a rather greasy aspect. From the Peak of Teneriffe. This enamel is sometimes covered with a rust-coloured crust. In some specimens scarcely any foreign body is observable, except some traces of white feldspar; in others the mass is rather less intensely black and more marked with spots of white feldspar, melted together with the enamel without having entirely lost their original tint.

B.—*Real obsidian, or volcanic glass*.—1. Obsidian of a black colour, of conchoidal fracture, divisible into sharp fragments, of deep black colour, and translucent on the edges; thinner fragments almost completely transparent, with scarcely any traces of a fuliginous tint. It is fusible before the blowpipe into a very white, shining, translucent glass, with minute superficial vesicles. From Mount Hecla, Teneriffe, Ascension, Vulcano, Lipari, Ponza, &c. 2. *Var.* of a globular form, black, opaque, but sometimes transparent, and faintly turbid or smoky. From Cap de Gates. Faujas refers this substance (which has been called *luchs-saphire* by some writers) to the homogeneous volcanic glasses, because it easily melts before the blowpipe into a white enamel, and because the globules are sometimes found imbedded in a greyish enamel, approaching to lamellar pumice. These globules are not always spherical. Their size is from that of a small pea to that of a large hazelnut. They are very light, though not porous; their external lustre is unctuous. 3. *Var.* forming a very fine black glass, with well defined, conchoidal fracture; and fragments nearly transparent on the edges, and of a weak olive-brown colour. In some parts white points and some small hollows are seen, which latter are lined with a white fused, rather vitreous, substance, which appears to owe its origin to such grains of feldspar as did not experience a sufficient degree of fusion to amalgamate with the obsidian. From Cerro de las Marejas, in Mexico. 4. *Var.* with intensely black ground, and well defined fracture, yielding sharp-edged fragments; the whole of the brilliant mass is filled with small, white, opaque, globular, and oblong spots, closely grouped together, and appearing like melted enamel, but rather unctuous. From the Lipari islands. 5. *Var.* of

a black colour, inclining to olive-green, disposed in more or less elongated, rather flexible, capillary filaments, often terminated by very small, round, or oblong globules; fusible before the blowpipe into globules of a greenish-black. From the isle of Bourbon. Lavas with small filiform particles of volcanic glass have also occurred in the island Vulcano. These are by some mineralogists looked upon as filiform crystals of augite or pyroxene; but M. Faujas says he has subjected them to closer examination, and found them to be volcanic glass.

C. *Pumice fines*.—The true pumice, says Faujas, which we should be careful not to confound with the lightest lavas, keeps the midway between the volcanic glasses and the enamels: it generally derives its origin from a peculiar kind of vitrification of compact feldspar, and some porphyritic rocks. Those of Lipari and Vulcano are the only known volcanoes that have produced pumice in considerable quantity: the isle of Lipari, in particular, is the vast magazine that furnishes almost the whole of the immense stores of this substance, consumed for the purposes of different arts, in almost all parts of Europe. In small quantity and in insulated fragments it occurs in the neighbourhood of several other volcanoes.

1. Pumice of a white colour, porous, light, rough to the touch, and fusible. From Campo-Bianco, the Lipari isles, Valle-del-Aqua, near Otto-Jano, &c. 2. *Var.* of a silky appearance, fibrous, and with capillary lineaments. From the same place. 3. *Var.* of a dark grey or black, sometimes greyish-white colour, with twisted pores; fibrous, including, among its fibres, more or less indeterminate crystals of white feldspar, which, in some of the specimens, are only seen on the rifts. From Ichia, Procida, from the neighbourhood of Naples. At Lipari, the varieties of black pumice are found in the hillock of the tomb of the Nafos. 4. *Var.* of a whitish colour, scaly, light, silvery, and semi-transparent. From Lipari. 5. *Var.* the same, but heavy. *Ibid.* 6. *Var.* of a grey colour, light, fibrous, with blackish, shining, sometimes crystallized, mica. In a pumice from Herculaneum, from the neighbourhood of Naples, from Ichia, Procida, &c. 7. Light, porous, or fibrous variety, with more or less angular nodules, and grains of black volcanic glass. From Lipari, Stromboli, Capo di Monte, at Scutello, in the neighbourhood of Naples; from Teneriffe, &c. 8. *Var.* the same, but whiter, with small thin fragments of a silvery-grey shistus. In the tuffa from Pleyth and other places in the vicinity of Andernach. 9. *Var.* with very small angular and irregular fragments of a vitreous, stony substance, of a sky-blue colour (now called *Latialite*, or *Häünye*). Among the varieties of pumice from Pleyth, &c. 10. *Var.* of a greyish-white colour, light, with nodules of obsidian of various sizes. From Teneriffe and Lipari. 11. *Var.* of a dark grey, sometimes rather brownish colour, heavier than the preceding variety; with vesicles, all of which are elongated in one and the same direction: gives out some sparks when struck with steel. From Lipari. 12. *Var.* of a silvery-white, composed of small lamellæ, or scales. Found among the other varieties at Lipari: it is rather lighter than the common white pumice.

CLASS XI. *Sulphur, and various saline substances, found sublimated in volcanoes and solfataras.*

The salts are: Glauber salt, nitre, alum, Epsom salt, mineral alkali, rock salt, efflorescent, in filaments and cubes, fall ammoniac, in rhombic, or dodecahedral crystals, generally of a topaz-yellow colour. Also gypsum, and calcareous spar; muriate of copper, in small deliquescent crystals; red and yellow orpiment.

CLASS XII. *Volcanic iron*, viz. titaniferous iron, as sand, and in small octahedral crystals, from various places; specular iron from several volcanoes in Italy and France; phosphate of iron, as powder in porous lavas from Capo di Bove, Etna, Val di Noto; or in small laminae, from Bouche, in the department of Allier, &c.; iron pyrites, in fine grains; oxys of iron; muriate of iron, of a yellow colour, from Vesuvius and Etna; and iron-vitriol, found in volcanic grottos, in the island of Vulcano.

Several intercelling observations on the nature of lava, and the various phenomena it presents under different circumstances, are given by Sir William Hamilton, father della Torre, Bolis, Tata, Breilach, Buch, and others, which will be more particularly noticed under the article *Volcano*.

The purposes for which the lava of Vesuvius, Etna, and other volcanoes is employed, are particularly those of building and paving. Also the ancients made use of it for these purposes, as appears from the presence of Vesuvian lava in the architectural remains and pavements found in Herculaneum and Pompei. That of Etna appears to be still more generally used for building, since, according to Ferrari, there is not a house in its neighbourhood that is not constructed of it. The rapid progress in the rebuilding of Catania was, in a great measure, owing to the facility with which the building materials were procured. Also mill-stones are made of the lava of Etna, many of which are exported to Calabria and Malta; and it has even been manufactured into cannon balls.

LAUACA, in *Geography*, a small island near the S. coast of Sardinia. N. lat.  $39^{\circ} 4'$ . E. long.  $8^{\circ} 36'$ .

LAVACRUM, in *Botany*, a name given by some authors to the common wild teasel, or *disficus sylvestris major*, Ger. Emc. Ind. 2.

LAUADEROS. See *LAVATORY*.

LAVAGNA, in *Geography*, a sea-port town of Genoa, at the mouth of a river of the same name, which rises in the Apennines; 12 miles W.N.W. of Brugnato.

LAVAL, a city of France, and capital of the department of the Mayenne, situated on the river Mayenne. The number of inhabitants is estimated at 14,154; the eastern division containing 6658, and the canton 15,175, on a territory of 145 kilometres, in 9 communes; and the western division comprehending 7496, and its canton 15,000, on a territory of 122½ kilometres, in 6 communes. In the town and its environs are manufactures of linen, which yield a considerable commerce. N. lat.  $48^{\circ} 5'$ . W. long.  $0^{\circ} 41'$ .

LAVAMUND, a town of the duchy of Carinthia, on the Drave; the see of a bishop, suffragan of the archbishop of Salzburg; 24 miles E. of Clagenfurt. N. lat.  $46^{\circ} 44'$ . E. long.  $14^{\circ} 37'$ .

LAVANDULA, in *Botany*, Lavender; so called from the Latin word *lavo*, to wash or besprinkle, alluding to its ancient use in baths or fomentations, or to that of its distilled water in more modern times. Linn. Gen. 290. Schreb. 386. Willd. Sp. Pl. v. 3. 60. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 382. Sm. Prodr. Fl. Græc. Sibth. v. 1. 339. Juss. 113. Tournef. t. 93. Lamarck Illustr. t. 504. Gært. t. 66. (Stechas; Tourn. t. 95.)—Class and order, *Didymia Gymnosperma*. Nat. Ord. *Verticillate*, Linn. *Labiata*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, ovate, obscurely toothed at the orifice, short, permanent, with a bractea at its base. Cor. of one petal, ringent, reversed; tube cylindrical, longer than the calyx; limb spreading; its larger lip turned upwards, cloven, spreading; the other directed downwards, in three roundish, nearly equal, segments. Stam. Filaments four, within the tube of the corolla,

short, pointing downwards, two of them shorter than the rest; anthers small. Pisl. Germen four-cleft; style thread-shaped, the length of the tube; stigma of two obtuse cohering lobes. Peris. none, except the calyx, which protects the seeds, its mouth being closed. Seeds four, obovate.

Eff. Ch. Calyx ovate, obscurely toothed, attended by a bractea. Corolla reversed. Stamens enclosed in the tube.

Obs. The *Stechas* of Tournefort differs from his *Lavandula*, in having the flowers ranged in many rows on the spike, and the whole crowned with an ornamental tuft of floral leaves.

Six species are described in the latest edition of Linnæus, eight in Willdenow, all of them admitted into the new Hortus Kewensis, but the last in the list erroneously. The rest are for the most part known and esteemed in every garden or green-house. All are shrubby, with blue or purplish, fragrant, spiked flowers, and their foliage is likewise aromatic, generally of a grey or hoary-green, narrow, either simple or compound. The spike is supported on a longish, naked, square stalk.

1. *L. Spica*. Common Lavender, or Spike. Linn Sp. Pl. 800. Woody. Med. Bot. t. 55. (Lavandula; Ger. em. 583, 584. f. 1—3. Rivin. Monop. Irr. t. 54. f. 1, 2.)—Leaves linear-lanceolate. Spike interrupted, naked at the summit.—Native of the south of Europe, hardy with us, and cultivated for the sake of its scent when dried. To be “laid up in lavender” is become proverbial for any thing stored up with peculiar care. The essential oil and distilled water are so generally used in perfumery, as to be no unimportant articles of commerce. The compound spirituous tincture, or lavender drops, is a popular cordial, very commodious for those who wish to indulge in a dram, under the appearance of an elegant medicine. This plant varies in the breadth of its leaves, from linear to lanceolate, inclining to obovate; hence the old writers describe and figure two kinds. The flowers are occasionally white, which also they have not omitted to notice.

2. *L. Stechas*. French Lavender. Linn. Sp. Pl. 800. (Stechas arabica; Rivin. Monop. Irr. t. 55. Str. five Spica hortulana; Ger. em. 585.)—Leaves linear, revolute, hoary. Spike close, crowned with a coloured leafy tuft. Bractæas somewhat three-lobed.—Native of Spain, Greece, the south of France, and the north of Africa. It will not bear our winters without the shelter of a green-house. The leaves are much smaller than in the former, more strongly revolute. Spikes uninterrupted, short, and thick, on but shortish stalks, their bractæas more or less distinctly three-lobed, purplish and woolly; those which crown the top of the spike, greatly dilated, wavy, undivided, of a beautiful purple, much paler than the flowers; rarely wanting.

3. *L. viridis*. Madeira Lavender. L’Herit. Sert. Angl. 19. Ait. Hort. Kew. n. 3. Hoffm. and Link Lustf. v. 1. 91. t. 4.—Leaves linear, revolute, rugose, villous. Spike close, crowned with a leafy tuft. Bractæas undivided.—Native of Madeira, from whence it was sent to Kew by Mr. Masson in 1777. It differs from the last in its rugose, green and villous, not hoary, leaves, its undivided bractæas, and its green, not purple, crown of the spike.

4. *L. dentata*. Tooth-leaved Lavender. Linn. Sp. Pl. 800. Curt. Mag. 400. t. 401. (Stechas folio serrato; Ger. em. 586.)—Leaves linear, finely pinnatifid, pectinate. Spike close, with a leafy crown.—Native of Spain, the north of Africa, and some parts of the Levant, not of Greece.—The very neatly-toothed leaves distinguish this species. Its spikes stand on long stalks, and are crowded, pale, with all the bractæas large, coloured, and somewhat membranous, a few

## LAVANDULA.

low at the top being rather the largest, and destitute of flowers, as in the two last. The *corolla* is often white. This is one of the species that has been longest cultivated in England, having been preserved in the dwelling-house before green-houses or stoves were invented.

5. *L. pinnata*. Pinnated Lavender. Linn. fil. Diff. 9. t. 1. Am. Acad. v. 10. 52. t. 2. Curt. Mag. 401. t. 400. Jacq. Misc. v. 2. 318. Ic. Rar. t. 106.—Leaves deeply pinnatifid; their segments wedge-shaped, obtuse, nearly entire. Spike linear, somewhat branched.—Native of Madeira, from whence Mr. Masson sent it in 1777. The leaves are finely hoary, with little scent, elegantly pinnatifid, and distinguished by their obtuse wedge-like segments. The spikes stand on very long stalks, and are much more slender than any of the former, often compound. The bractæes are imbricated, uniform, ovato-lanceolate, pointed, coriaceous, not membranous, slightly coloured, and there is no leafy crown at the summit. The corolla is of a delicate blueish-purple, like the Common Lavender, but larger and more showy.

6. *L. multifida*. Cut-leaved Canary Lavender. Linn. Sp. Pl. 800. (L. folio multifido; Rivin. Monop. Irr. t. 54. f. 3. *Stachas multifida*; Ger. em. 585.)—Leaves doubly pinnatifid, hoary. Spike ovate, mostly simple. Bractæes woolly, elliptical, with distant ribs. Native of Spain, Barbary, and the Canary islands. One of the species longest cultivated in England, though it requires protection in winter. The Hortus Kewensis marks this plant as biennial, and we have a French specimen marked annual. It has certainly more of an herbaceous than shrubby appearance. The leaves are hoary, doubly and very deeply pinnatifid, with decurrent segments, whose extremities are acute, and in some measure elliptical. Spikes rather ovate and thick, very rarely, if ever, producing a small branch or two from the bottom. Bractæes membranous, broadly elliptical, besprinkled with wool, furnished with three strong ribs, equally distant from each other, and from the edge. There are no barren leafy bractæes at the top.

7. *L. abrotanides*. Southernwood-leaved Canary Lavender. Lamarec Dict. v. 3. 420. Willd. n. 7. (L. folio longiori, tenuis et elegantius dissecto; Tourn. Infl. 198. Comm. Rar. t. 27.)—Leaves doubly pinnatifid, with linear segments, nearly smooth. Spike linear, mostly branched and interrupted. Bractæes smoothish, ovate, with approximated ribs.—Native of the Canaries, long known in gardens. The stem is shrubby. Leaves with finer, more linear, and greener segments than in the last. The narrowness and branching nature of the spikes more accord with *L. pinnata* than with *multifida*, with which latter this species has long been confounded. The bractæes also most resemble those of *pinnata*, but are more membranous, and far less hoary. Their ribs generally three, sometimes five, are always closer together than in *multifida*.

The eighth species of Willdenow, *L. carnosa*, Linn. fil. Diff. 9. t. 2. Am. Acad. v. 10. 52. t. 3. (Katu-Kurka; Rheede Hort. Mal. v. 10. 179. t. 60.), found by Koenig on dry walls and rocks at Sadras in the East Indies, and sent to Kew in 1788 by sir Joseph Banks, where it is kept in the stove, being a tender biennial, is most certainly not a *Lavandula*, but a *Plectranthus*, as its habit, and the large deflexed upper segment of its calyx, both evince. See PLECTRANTHUS.

LAVANDULA, in Gardening, comprises plants of the shrubby evergreen kind, of which the species cultivated are, the common lavender (*L. spica*); the French lavender (*L. stachas*); the tooth-leaved lavender (*L. dentata*); and the Canary lavender (*L. multifida*).

The first fort has varieties with narrow leaves with blue

flowers, and with white flowers with broad leaves, and dwarf lavender.

It may be remarked that this species is the common lavender; but the narrow-leaved variety with blue flowers is the fort cultivated for its flowers for medicinal purposes.

And that the broad-leaved fort has much shorter and broader leaves, and the branches are shorter, more compact, and fuller of leaves; it continues several years without producing flowers; and when it does, the leaves on the flowering-stalks approach nearer to those of the common lavender, but are still broader; the stalks grow taller, the spikes are looser and larger, the flowers smaller, and appear a little later in the season.

The second kind has varieties with white flowers; and with purple flowers.

The fourth species has a variety which rises with an upright, branching, square stalk, four feet high; the leaves longer, and cut into narrower segments than the Spanish plant; they are of a lighter green, and almost smooth; the naked flower-stalk is also much longer, and terminated with a cluster of spikes of blue flowers; at two or three inches below these are two small spikes, one on each side; the flowers are smaller than those of the first fort.

*Method of Culture.*—All the forts are readily increased, by planting slips or cuttings of their young shoots in the spring. With the first two forts, a quantity of slips or cuttings should be taken off in the early spring, as March or April, from three or four, to six inches long, stripping off the under leaves, then planting them in a shady border, four inches asunder, giving a good watering, and repeating it occasionally in dry weather. When the plants are well rooted in summer, they should be transplanted into the places where they are to grow early in autumn, as September or October, with balls of earth about their roots.

And where the first fort is intended to produce flowers for economical purposes, it should be planted in rows, two or three feet asunder, and about the same distance in the rows, or in a single row one or two feet asunder, along the edges or divisions of garden-grounds, in a sort of edging or dwarf hedge; in either of which modes the plants grow freely, continuing in root, stem, and branches several years, and produce abundance of spikes of flowers annually for gathering in the latter end of summer; the culture afterwards is principally to cut down any remaining decayed flower-stalks in autumn, pruning or cutting away any disorderly out-growing branches at top and sides, and digging the ground occasionally in spring or autumn along the rows of plants.

In regard to the second fort, it may also often be raised from seeds, which should be sown in a bed of light earth in the early spring, and raked in evenly with a light hand. The plants rise in about a month, when, if there be dry weather, water should be given; and after they are three inches high, they should be pricked out in beds, half a foot apart, watering them as they require, until fresh rooted. They should stand here till the following spring, and then be thinned out, and planted where they are to remain.

The third and fourth forts may be increased by slips and cuttings, planted in pots, in the early spring months, and placed under frames, due water, and shade from the mid-day sun, being given till they are rooted; when a little advanced in growth, transplanted into separate small pots, and managed as other green-house exotic plants.

The two first forts are useful for their fine spikes or flowers, as well as ornamental in assemblage with other shrubby plants, in the borders and clumps of pleasure-grounds; and the two last forts in the green-house collection

with

with other plants. Those designed for shrubberies or other similar places, being previously raised to some tolerable bushy growth, and a foot high or more, should be planted either in the early autumn, or in the spring, disposing them singly at proper distances in the fronts of the clumps, borders, &c. See LAVENDER.

LAVANDULA, *Lavender*, in the *Materia Medica*. The common lavender, or *lavandula spica*, was formerly considered, says Woodville, as a species of *Nardus*, and appears to be the pseudo-nardus of Mattheolius and Pliny. This plant, which grows spontaneously in many of the southern parts of Europe, appears from Turner to have been cultivated in England previously to the year 1568. The fragrant smell of the flowers is well known, and to most persons is agreeable; to the taste they are bitterish, warm, and somewhat pungent; the leaves are weaker, and less grateful.

The flowers and summits of the narrow-leaved or common lavender are, in a very eminent degree, cephalic and nervine. They are often employed as a perfume, and medicinally as mild stimulants and corroborants, in palfies, vertigoes, lethargies, and tremors of the limbs, both internally and externally.

The flowers are sometimes used in the form of a conserve, into which they are reduced by beating them, while fresh, with thrice their weight of double refined sugar. Water extracts by infusion nearly all the virtue both of the leaves and flowers: in distillation with water, the leaves yield a small portion of essential oil; but the flowers, in their most perfect mature state, about one ounce from sixty. Woodville observes, that in order to obtain the largest quantity of essential oil from these and most other flowers of this kind, they should be allowed to grow to their full maturity, and be dried for some time. This oil is of a bright yellow colour, a very pungent taste, and possesses, if carefully distilled, the fragrance of the lavender in perfection: it is given internally from one drop to five, and employed in external applications for stimulating paralytic limbs, and for destroying cutaneous insects. It is also said, that if spongy paper be dipped in this oil, and applied to the parts, it immediately kills the pediculi inguinales. Rectified spirit extracts the virtue of lavender more completely than water. The simple spirit of lavender, prepared by pouring a gallon of proof spirit on two pounds of the fresh gathered flowers, adding water sufficient to prevent empyreuma, macerating for 24 hours, and distilling a gallon by a gentle fire, is richly impregnated with the fragrance of the flowers. More compounded spirits, in which other aromatics are joined to the lavender, have been distinguished by the name of English or palfy drops: the college of London (1809) directs three pints of the simple spirit of lavender, and one pint of spirits of rosemary, to be digested on half an ounce of cinnamon, half an ounce of nutmegs, both bruised, and an ounce of red sanders wood sliced as a colouring ingredient, macerating for 14 days, and then straining; the college of Edinburgh, to the same quantity of both spirits, orders one ounce of cinnamon, two drams of cloves, half an ounce of nutmegs, and three drams of red sanders. These preparations are taken internally on sugar or in any convenient vehicle, from ten to one hundred drops, and used externally in embrocations, &c.

The medicinal virtue of lavender resides in the essential oil, which is supposed to be a gentle corroborant and stimulant of the aromatic kind; and is recommended in nervous debilities and various affections proceeding from a want of energy in the animal functions. According to Dr. Cullen (*Mat. Med. vol. ii.*) it is, "whether externally applied or given internally, a powerful stimulant to the nervous system; and among the others of this order, named cephalics, the la-

vender has a very good and perhaps the best title to it." And he further says, "it appears to me probable, that it will seldom go farther than exciting the energy of the brain to a fuller impulse of the nervous power into the nerves of the animal functions, and seldom into those of the vital. It was, however, with great propriety, that professor Murray dissuaded its use where there is any danger from a stimulus applied to the sanguiferous system. It is however still probable, that lavender commonly stimulates the nervous system only, and therefore may be more safe in palfy than the warmer aromatics, especially if the lavender be not given in a spirituous menstruum, or along with heating aromatics, which however is commonly done in the case of the spiritus lavendulæ compositus." The official preparations of lavender are the essential oil, a simple spirit, and a compound tincture, already mentioned.

The broad-leaved lavender, a variety of the former, to which foreign writers have given the name of spike, is stronger both in smell and taste than the other, and yields in distillation almost thrice as much essential oil; but the flavour of the oil and of the plant itself is much less grateful: the oil is likewise of a much darker colour, incising to green. This oil, mixed with  $\frac{1}{4}$ ths of rectified spirit, or oil of turpentine, was the "*Oleum spicæ*," formerly highly celebrated as an application to indolent tumours, old sprains, diseased joints, &c. See *Oil of SPIKE*.

LAVANGE, in *Geography*, one of the Virgin islands in the West Indies; three miles S.E. from the island of St. Thomas.

LAVANSAARI, an island of Russia, on the coast of Livonia, 80 miles from the capital, four miles and a half long, and two broad, surrounded on the N.W. side by islets and shallows, having three tolerable harbours, and occupied by about 40 families. Some patches of soil are cultivated, and in the middle of the island is a small lake.

LAVANT SEE, a lake of Stiria; nine miles E. of Neumark.

LAVARA, in *Ancient Geography*, a town of Hispania, in the interior of Lusitania. Ptolemy.

LAVARDAC, in *Geography*, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Nérac. The place contains 928, and the canton 9482 inhabitants, on a territory of 182 $\frac{1}{2}$  kilometres, in 14 communes.

LAVARETUS, in *Ichthyology*, the name of a small fish called by some the *gang-fish*, and the *rhingau*, and by Marcgrave the *curimata*. It seems of a middle nature, between the trout and herring kind, and is caught in vast quantities, in the months of March and April, in several of the lakes in Germany, and is pickled, and sent to different parts of the world. It seldom grows to more than four inches long.

LAVARETUS. See SALMO *Lavaretus*.

LAVATER, JOHN GASPARD CHRISTIAN, in *Biography*, was born at Zurich in 1741. He was intended for the Protestant ministry, and entered upon holy orders in 1761. He acquired an early reputation by the eloquence of his pulpit discourses, and the zeal and benevolence with which he fulfilled the duties of his functions. He felt an early propensity to read the human countenance, and frequently exercised the pencil in sketching such features as had made a particular impression on him, which he studied with great attention. Accident led him to the study of physiognomy; standing at a window with Dr. Zimmerman, he was led to make some remarks on the singular countenance of a soldier that was passing by, which induced the physician to urge him to pursue and methodize his ideas. He accordingly

ingly began the pursuit, and in process of time, with the natural progress of an enthusiastic mind, acquired not only a fondness for the study, but a full conviction of the reality of the physiognomical science, and of his own great discoveries in it. In 1776, he published the first fruits of his labours in a quarto volume, entitled "Fragments." He took in them a wide range of inquiry, and carried his ideas of physiognomy beyond the observation of those parts of the countenance which exhibit to a common eye the impressions of mental qualities and affections, and maintained, as a leading position, "that the powers and faculties of the mind have representative signs in the solid parts of the countenance." Two more volumes appeared in succession, which presented a most extraordinary assemblage of curious observations, subtle and refined reasoning, delicate feeling, and philanthropical and pious sentiment, together with a large admixture of paradox, mysticism, whim, and extravagance. The whole is illustrated with a great number of engravings; many of which are highly finished and singularly expressive. The work was soon translated into the French and English languages, and for a time became the favourite topic of literary discussion. The work now is rarely referred to except for the plates; the science itself is gone into utter neglect. Lavater is well known for a work entitled "Aphorisms on Man," of which an English translation was published in 18mo. in the year 1788. He was a zealous Christian, and translated into the German language "Ronne's Enquiry into the Evidences of Christianity." His popularity as a preacher and pastor was extremely great at Zurich, where the people exhibited to him tokens of the highest respect and the most affectionate veneration, and he was applied to by persons of all ranks as the arbiter of controversies among them. His moral character was exemplary, and his ardent zeal for doing good was scarcely at any time surpassed. No man was ever a more determined opposer to tyranny and intolerance in every shape; he had the true Swiss zeal for liberty. This noble spirit rendered him a friend to the French revolution at the outset, but when the republican rulers began to display a system of rapine and extortion, and to extend this even to Switzerland, he was the boldest of their antagonists. When Zurich was stormed in 1797, he rushed into the streets, and received a severe wound in the breast from a Swiss soldier, on whom he had conferred important benefits. From the effects of this he never entirely recovered; but the activity of his mind was unsubdued till a short time before his death, which happened on the 2d of January 1801, when he was in the sixtieth year of his age. A warm desire to promote the honour of God, and the good of his fellow creatures, was the principal feature in his character, and the leading motive of all he did. Next to these were an indefatigable placability, and an inexhaustible love for his enemies. Monthly Mag. Ann. Regiller.

LAVATERA, in *Botany*, so named by Tournefort, in the Memoirs of the Academy of Paris for 1706, after Dr. Lavater, a physician of Zurich, who is said to have written nothing on the subject of botany, nor have we any information concerning him. Linn. Gen. 354. Schreb. 467. Willd. Sp. Pl. v. 3. 793. Mart. Mill Dict. v. 3. Sm. Fl. Brit. 742. Juss. 272. Cavan. Diss. 86. Lamarck. Illustr. t. 582. Czertn. t. 136.—Class and order, *Monadelphica Polyandria*. Nat. Ord. *Columbifera*, Linn. *Malvaceae*, Juss.

Gen. Ch. Cal. Perianth double; the outer of one leaf, three-cleft, obtuse, shortell, permanent; inner of one leaf, cut half way down into five segments, sharper and more erect, likewise permanent. Cor. Petals five, inversely heart-shaped, flat, spreading, their lower parts attached to the tube of the filaments. Stam. Filaments numerous, united

below into a tube, separating loosely at its top and sides, anthers kidney-shaped. Pysl. Germen superior, orbicular depressed; style cylindrical, short; stigmas several, from seven to fourteen, bristle-shaped, as long as the style. Peric. Capsules numerous, equal in number to the stigmas, of two valves, opening inwards, ranged in a depressed circle round the columnar receptacle, at length deciduous. Seeds solitary, kidney-shaped.

Eff. Ch. Calyx double; the outer three-cleft. Capsules numerous, ranged in a circle, single-seeded.

One of the most handsome of the malvaceous order, at least of those found in Europe, to which quarter of the world, and the north of Africa, the whole genus is confined; for the Linnæan *L. americana* is no other than *Sida abutiloides* of Jacquin, and Willdenow, n. 48. Eight species, exclusive of this, are detailed in Syst. Veg. ed. 14; Willdenow has twelve, seven of which are shrubby, five herbaceous and mostly annual.

In the first section are

*L. arborea*. Sea Tree-Mallow. Linn. Sp. Pl. 972. Cavan. Diff. t. 139. f. 2. Engl. Bot. t. 1841.—Stem arborescent. Leaves downy, plaited, with seven angles. Flower-stalks axillary, clustered, single-flowered.—Found upon rocky cliffs on the south-west coast of England and east coast of Scotland, as well as in other parts of Europe, flowering in July and August. It is naturally biennial, though of a shrubby habit and above six feet high, for it blossoms but once, though it will, in a garden, sometimes survive many winters before that event takes place. The stem is round and thick, branching at the top chiefly, where it forms a leafy head. The leaves are alternate, flaked, pliable and downy, of seven shallow crenate lobes. Flowers numerous, axillary, purple, very like those of the common *Malva sylvestris*, but rather more handsome.

*L. triloba*. Three-lobed Tree-Mallow. Linn. Sp. Pl. 972. Jacq. Hort. Vind. v. 1. 30. t. 74.—Stem shrubby. Leaves rounded, crenate, somewhat heart-shaped, slightly three-lobed. Stipules heart-shaped. Flower-stalks aggregate, single-flowered.—Found on the coasts of Spain and France. With us it is a greenhouse plant, not easily kept nor much valued, being far more beautiful on its native rocks, where the light hoary green of its copious foliage, is prettily contrasted with the large, very delicate, rose-coloured flowers. The broad stipules are remarkable.

*L. maritima*. Soft Single-flowered Tree-Mallow. Gouan. Illustr. 46. t. 21. f. 2. (*Althæa frutex* Clusii; Ger. em. 933f.)—Stem shrubby. Leaves rounded, crenate, bluntly angular, soft and downy. Stalks axillary, solitary, single-flowered.—Native of Spain and the south of France. Linnæus did not distinguish its synonyms from the last, though it differs abundantly in the much greater softness of the leaves, want of stipules, and the solitary flower-stalks. The flowers are large and elegant, of a light purple with dark claws. We have seen this species blossoming in Mr. Argericini's fine conservatory at Blackheath, but it finds no place in the 1st edition of *Hort. Kew.* or the 5th of *Hort. Cant.*

Of the second section are

*L. thuringiaca*. Great-flowered Lavatera. Linn. Sp. Pl. 973. Jacq. Austr. t. 311. Curt. Mag. t. 517.—Stem herbaceous, downy. Leaves somewhat downy; the lower ones angular; the upper three-lobed. Flower-stalks axillary, single-flowered.—Native of Hungary, Tartary, Germany, &c. about hedges; a hardy perennial in our gardens, flowering from July to September, and propagated either by root or by seed; yet as Curtis observes "it is rarely met with in any of our collections;" possibly because the *trimesis* is preferred. The stems are few, erect, three or

four feet high, clothed with short soft hairs. *Leaves* stalked, dependent, but slightly downy. *Flowers* on long solitary stalks, with large, pink, veiny petals, inversely heart-shaped, their sinuses "puckered" as Curtis says; but this is not represented by Jacquin in his wild plant, and is perhaps an indication of luxuriance only.

*L. cretica*. Small-flowered Lavatera. Linn. Sp. Pl. 973. Jacq. Hort. Vind. v. 1. 15. t. 41.—Stem herbaceous, rather hairy. *Leaves* acutely five-lobed. Flower-stalks axillary, aggregate.—Native of Crete, cultivated by Miller in 1768, and we believe still preserved in Chelsea garden, coming up spontaneously from seed, the root being annual. There is nothing to recommend it to general admiration, the *flowers* being far less ornamental than the wild *Malva sylvestris*, which the plant resembles in herbage. We have a specimen from the Göttingen garden named *Lavatera sylvestris* of Link.

*L. trimifris*. Spanish Annual Lavatera. Linn. Sp. Pl. 974. Jacq. Hort. Vind. v. 1. 29. t. 72. Curt. Mag. t. 109.—Stem herbaceous, rough with deflexed hairs. *Leaves* smoothish, heart-shaped, angular; the lower ones rounded. Flower-stalks solitary, shorter than the leaves.—Native of Spain, France, and the Levant, a hardy annual in our gardens, where it is raised without trouble, producing abundance of large, pink or white, very showy blossoms, all summer long. The *stem* is branched, two feet high, rough in the upper part especially, with simple deflexed hairs. The *leaves* are nearly smooth on the upper side, more or less downy beneath, all heart-shaped; the upper ones most angular, the lower more rounded, but still rather lobed. *Flower-stalks* hairy, shorter than the leaves.

*L. punctata*. Dotted-stalked Lavatera. Allion. Auſtr. 26. Willd. n. 11. (*Malva folio vario*; Bauh. Prodr. 137. t. 137.)—Stem herbaceous, rough with starry points. *Leaves* downy; the lower ones rounded, the upper hastate. Flower-stalks solitary, elongated.—Native of the country about Nice, according to Allion, who first, among modern botanists, determined this very distinct species, but did not advert to Bauhin's synonym, which Linnæus had referred to the preceding, but which, from the excellent figure and description, we have no hesitation in applying to this. *L. punctata* is an annual, distinguished from the last by its starry pubescence, much more downy *foliage*, and much smaller purple *flowers*, on longer and more slender stalks. The *leaves* also grow on long footstalks, and differ greatly in shape, the lower ones being heart-shaped, short and rounded, slightly lobed; some higher up deeply and sharply five-lobed; but most of the upper ones hastate; all are crenate. The *calyx* is soft and downy.

LAVATERA, in Gardening, comprehends plants of the herbaceous perennial kinds, of which the species most generally cultivated are the Cretan lavatera (*L. cretica*); the common annual lavatera (*L. trimifris*); the great-flowered lavatera (*L. thuringiaca*); the tree lavatera or mallow (*L. arborea*); the downy-leaved lavatera (*L. obliqua*); the three-lobed lavatera (*L. triloba*); and the Portuguese lavatera (*L. lusitanica*).

The first sort varies with red flowers, with white flowers, and with purple flowers.

The second kind has likewise several varieties.

*Method of Culture*.—The first two, or annual sorts, are readily increased, by sowing the seeds in a light soil in the places where the plants are to remain, or in pots, in the spring season, as about the latter end of March, in patches of four or five in each, giving them water occasionally when the weather is dry. When the plants have attained a little growth, they should be thinned out to one or two of the strongest plants. When any are to be removed to other

places, it should be done at this period, and with a little earth about the roots, due water and shade being given; but they seldom succeed well by transplanting.

All the other shrubby perennial sorts may likewise be increased by sowing the seeds, and managing the plants in the same manner. Most of these sorts will not last more than two years in this climate, unless the soil be dry, when they continue three or four.

They in general require a warm dry situation, or to have their roots covered by old tan, or the protection of the greenhouse during the severity of the winter season.

These plants are highly ornamental in different parts of pleasuring-grounds. The annual sorts have great beauty, in their flowers being large, numerous, and conspicuous, and are proper where large showy-flowering plants are required. The perennial kinds are also suitable for large borders and shrubby compartments, having large, straight, upright, durable stems, terminated by branched bushy heads, and very large soft foliage; that form a variety in assemblage with other plants, though their flowers are often hidden by their large leaves.

LAVATION, in Antiquity, a feast of the Romans, in honour of the mother of the gods, instituted in memory of the day when the worship of Cybele was transferred from Phrygia to Rome, and celebrated on the twenty-fifth of March.

LAVATORY, or LAVADERO, a name given to certain places in Chili and Peru, where gold is got out of earth by washing.

M. Frezier gives us the following description of the lavatories of Chili: they dig deep into the earth, in such places as they have reason to expect gold in; and, in order to facilitate this digging, they turn a stream of water upon the spot, loosening the earth as much as possible all the time, that the current may have the greater effect, and tear up the earth more strongly. When they are got to the earth they want, they turn off the stream, and dig dry.

The earth that they now get is carried on mules, and discharged into a basin, made somewhat in the manner of a smith's bellows, into which a little rivulet of water runs with a great deal of rapidity, dissolving the parts of the earth, and carrying every thing away with it, excepting the particles of gold, which, by their great weight, precipitate to the bottom of the basin, and mix with a fine black sand, where they are almost as much hidden as they were before in the earth. See *History of GOLD*.

Sometimes they find very considerable pieces in lavatories, particularly some pieces of 24 ounces each. There are several lavatories where they find these pebbles, or pieces of virgin gold, of a prodigious size. Among others, they tell of one that weighed 512 ounces, bought by the count de la Moncloa, viceroy of Peru.

Nine or ten leagues to the east of Coquimbo are the lavatories of Andacoll; the gold of which is 23 carats fine. Their work here always turns to great profit, excepting when the water fails them. The natives maintain that the earth is creative (*creatrix*); that is, it produces gold continually; because, after having been washed sixty or eighty years, they find it impregnated afresh, and draw almost as much out of it as at first.

LAVATRIS, in Ancient Geography, a place of Great Britain, mentioned in Antonine's 5th Itinerary, situated between Cataracton or Cataract, and Vertevic or Bough, and supposed to be Bowes in Yorkshire.

LAVAU, in Geography, a town of France, and chief place of a district, in the department of the Tarn, before the revolution the see of a bishop; 18 miles N.E. of Toulouse.

Houfe. The place contains 6237, and the canton 14,730 inhabitants, on a territory of 252½ kilometres, in 22 communes. N. lat. 43° 41'. E. long. 1° 53'.

LAUBACH, a town of Germany, in the principality of Solms Laubach; 40 miles N.E. of Mentz. N. lat. 50° 32'. E. long. 8° 50'.

LAUBAN, or LUBAS, a town of Lufatia, on the river Queifs, furrounded by a wall and fome battions. The trade of the place in cloth and linen is confiderable; 13 miles E.S.E. of Gorlitz.

LAUCHA, a town of Saxony, in Thuringia, on the Unfrutrit; 32 miles N.E. of Erfurt. N. lat. 51° 14'. E. long. 11° 47'.

LAUCHHEIM, a town of Germany, belonging to the Teutonic knights; 10 miles W. of Nordlingen. N. lat. 48° 32'. E. long. 10° 14'.

LAUCHSTÄDT, a town of Saxony, in the territory of Merfeburg; 4 miles W. of Merfeburg. N. lat. 51° 26'. E. long. 12° 1'.

LAUCKISSKEN, a town of Pruffia, in the circle of Samland; 25 miles E.N.E. of Königsberg.

LAUD, WILLIAM, in *Biography*, archbifhop of Canterbury, the fon of a clothier of Reading, in Berkfhire, was born in October 1572, and having received his grammar learning at the fchool of that town, he was fent to the univerfity of Oxford in 1589, where he was entered of St. John's college. Of this college he was admitted a fellow, and at the proper periods he took his degrees. In early life he was efteemed by all who knew him as a very forward, confident, zealous perfon. He was ordained deacon in 1600, and in the following year he took prieft's orders, and read a divinity lecture in the college. It was about this time that he maintained the conflant and perpetual vifibility of the church of Chrift, derived from the apoftles to the church of Rome, and continued in that church till the reformation. In 1605, he was chofen proctor of the univerfity, and in the fame year he was appointed chaplain to Charles Blount, earl of Devonfhire. In 1604, he took his degree of bachelor of divinity, and in the exercife which he performed on this occafion he maintained the neceffity of baptifm; and that there could be no true church without diocefan bifhops. From the drift of his difcourfe he was fuppofed to be ftrongly inclined to popery. Dr. Abbot had already been his antagonist, and on this occafion he made no fcruple of charging him with being a Papift in the moft public manner, fo that it was fcarcely fafe to be confidered his friend and companion. In the year 1605, Mr. Laud married the earl of Devonfhire, his patron, to Penelope, the late wife of lord Rich, who had been divorced from him for adultery. In juftification of himfelf, he contended that the innocent and guilty might lawfully marry again, after a divorce had been obtained. The part which he took in this affair expofed him to much cenfure from the public, gave great offence to the fovereign, and made fo deep an impreffion on the mind of Laud, that he ever afterwards obferved the anniversary of the marriage as a day of falling and humiliation. His firft preferment in the church was to the vicarage of Stamford, in Northamptonfhire, in the year 1607, which led to other fituations of more value and importance. In 1611, he was elected prefident of St. John's college, and very foon after was appointed one of his majesty's chaplains. He had now great hopes of rifing with rapidity to the higheft honours, but his expectations were fo completely difappointed, that in the year 1614 he had determined to withdraw from the court. By the perfuafion of Dr. Neile, bifhop of Lincoln, he was induced to remain there another year; to keep up his fpirits the pre-

late gave him a prebend in the church of Lincoln, and, in the following year, the archdeaconry of Huntingdon. In 1616, the king prefented Dr. Laud to the deanery of Gloucefter, and at the fame time required him to reform and fet in order whatever was amifs in that cathedral. He was diligent in obeying the royal mandate, and made great alterations in the church, which being effeeted, he recommended, that the members of that church fhould make their humble reverence to God not only at their firft entrance into the choir, but at their approaches to the holy table, which he had removed from the middle of the church to the eaft end of the choir. Thefe changes gave great offence to many perfons on account of their fuperftitious tendency, particularly to Dr. Miles Smith, bifhop of Gloucefter, who from that moment would never enter the church again fo long as he lived. Laud now began to take an active part againft the Puritans; and he was alfo very defirous to bring the church of Scotland to a uniformity with that of England; with this view he attended the king in a journey to Scotland, but nothing was gained by the expenfive tour, excepting that the king faw his commands neglected, and his authority contemned. Upon his return he was made a prebend of Weftminfter, and in the following year he was nominated to the bifhopric of St. David's, chiefly through the intereft of the lord-keeper Williams, at the infigation of the favourite Buckingham, to whom Laud had recommended himfelf. In the year 1622, bifhop Laud held a conference with Fifher, a Jefuit, before the marquis of Buckingham and his mother, in order to confirm them both in the Proteftant religion, with refpect to which they were then wavering. From this time a clofe intimacy fubfifted between Laud and Buckingham, who made the bifhop his confeffor and counfellor; and when he went with prince Charles into Spain, left him as his agent at court, with whom he maintained a frequent correffpondence. In the courfe of this, he infinuated fome heavy charges againft his friend, the lord-keeper Williams. This circumftance occafioned a fettered enmity between the two bifhops, Williams accufing Laud of the deepeft ingratitude on that account. Laud correffponded with the duke of Buckingham during his journey to France, to bring about a marriage between the princefs Henrietta-Maria and king Charles I. Supported by Buckingham's favour, to whom he is charged with having rendered himfelf too fubfervient, bifhop Laud gained the confidence of the new king, and it was faid that thefe two men ftopped up both the king's ears from any other doctrines in church or ftate, but what was infufed by them. Laud was defired by king Charles to make out a list of the eminent divines with their principles and qualifications, that from this list he might felect his chaplains, and others for promotion in the church. Laud quickly gave in his list, of whom his friends had the mark O againft their names, for "orthodox," but thofe whom he did not delight to honour, he branded with a P, fignifying, that they were Puritans, and, as fuch, ought not to be trufted with any power whatever. At the coronation in 1626, Laud officiated as dean of Weftminfter, by the king's appointment, in the room of bifhop Williams, who was in difgrace. In the fame year he was tranflated from St. David's to the bifhopric of Bath and Wells, and was alfo appointed dean of the chapel royal. In 1627 he was fworn a member of the privy council, and, in 1628, tranflated to the fee of London. By the advice of Laud all ecclefiaftical preferments were given away, and the whole country was almoft entirely governed. Upon the affafination of the duke of Buckingham he prevailed on the king to fend to the judges for their opinion,

“whether, by law, Felton might not be racked:” they returned a decided opinion, “that he could not be racked by the laws of England.” Bishop Laud was the most active and leading member of the high-commission court, the arbitrary and severe proceedings of which were justly odious to the nation. For an instance of the extreme rigour and cruelty of their proceedings, we refer to the article *LEIGHTON*, a learned Scotch prelate, who was sentenced to stand in the pillory, and to have his ears cut off, and his nose slit, and then to be imprisoned for life, on account of a book which he had written. No sooner was the savage sentence passed, than bishop Laud pulled off his cap, and gave God thanks for it. In the year 1630, bishop Laud was elected chancellor of the university of Oxford, to which he was a great benefactor. He adorned it with many noble buildings, and enriched it with books and curious MSS. in almost all the known languages of the world, procured at an immense expence. In 1631, bishop Laud undertook to repair and beautify St. Paul’s cathedral, which he accomplished in a very magnificent style; but to raise the money which was expended, he resorted to so many oppressive and unjustifiable methods, that it became the common proverb, and St. Paul’s was repaired with the fins of the people. Laud shewed great zeal in obtaining the utmost deference to all the external rites and ceremonies of the church, and he caused the several churches, in which he took an interest, to be adorned with all kinds of pictures, images, and altar-pieces, all which circumstances led the people to suspect, that he was too much inclined to the papal religion, if he were not already a Papist in his heart. This suspicion was still strengthened by his declaration, that in the disposal of all ecclesiastical preferments, he should give a most decided preference to single men, supposing the abilities of the single and married to be otherwise equal. In 1633, he attended the king in a journey to Scotland, and was present at his coronation for that country, which ceremony was performed in the abbey church of Holyrood-house. While in Scotland, he took every opportunity of urging the clergy to conformity with the church of England, but in this he was completely unsuccessful. Almost immediately after his return, Abbot, the archbishop of Canterbury, died, and Laud was instantly appointed his successor. He was, almost at the same moment, offered a cardinal’s hat, which he declined, but upon what grounds he refused the honour is not known, though various motives have been assigned. He now carried matters very high, drove many of the French and Dutch Protestants, to whose ancestors Edward VI. had given an asylum, out of the kingdom; and either imprisoned or silenced many worthy clergymen, who refused to read the king’s declaration for allowing lawful sports on Sundays after divine service. He was still more severe against those who were any ways suspected of puritanical principles. Some of them, by an exertion of arbitrary power, were fined, imprisoned, and even whipped, and kept to hard labour. Laud was, in 1635, nominated to other high offices, among which was the office of a commissioner of the treasury. He now procured the lord treasurer’s staff for his friend Dr. Juxon, the bishop of London, which gave great offence to the people. (See *JUXON*.) We cannot give any thing like a detail of the many prosecutions in which the archbishop was almost constantly engaged, they will be found in other articles of this work. (See *BASTWICK*, *PRYNNE*, &c.) It is sufficient to say in this place, that these prosecutions were cruel, illegal, and tyrannical; but they were not borne by the people without deep, though silent, complaints. Never was man more hated, or more detested so: there still existed in the country the printing press, by means of which his proceedings and character, and the arbi-

trary measures of the court, were exposed to the whole nation, in a secret manner. He accordingly procured a decree to be made in the star-chamber, which ordained, that the number of printers should be limited; and those who were allowed to follow the profession, should not be allowed to print any books of divinity, law, physic, philosophy, or poetry, till they had been licensed by the archbishop of Canterbury, or the bishop of London for the time being, upon pain of very grievous penalties. These proceedings, though they might be useful to the court for a short time, created so many enemies to the existing state of things, that there was great danger of some sudden convulsion. Many of the best men in the country, to avoid persecution, retired to America for an asylum, and a multitude of others would have followed their example, had not the archbishop obtained an edict to prevent any one from leaving the kingdom without a licence for that purpose. This was a degree of severity scarcely paralleled in the Christian world, but it answered no good end, for the people took a general disgust, and almost the whole of England was filled with Puritans. Laud did not confine his arbitrary measures to England, but was equally violent in his plans with regard to Scotland, so that he drew upon his head the hatred of that kingdom, and provoked the resistance which led to the renewal of the solemn league and covenant, subscribed by king James, and the whole nation in the year 1590. The attempt made in 1637, to force on the Scotch the new liturgy, was the first step which called forth the open opposition of all ranks. The king at first raised a powerful army to reduce the covenanters to submission, but when he had marched to the borders of Scotland, he found the preparations made to receive him so serious, and he knew that his Protestant nobility and soldiers were not zealously affected in his cause, that he found himself compelled to seek for a general pacification. It was soon discovered that the idea of war was not abandoned, but only deferred, and that the English court were resolved to subdue the spirit of the people in Scotland. Laud and Strafford were the advisers of this resolution, and to raise supplies, application was made to the English parliament, which, after an interval of twelve years, was summoned to meet at Westminster for that purpose. The commons not only refused to comply with the desires of the crown, but appointed committees to consider the grievances under which they laboured. The king wished them to commence with a subsidy bill, which they refused; he at length dissolved the parliament, in great anger, before a single act was passed. All the engines of arbitrary power were set to work to raise money for the war, and those who refused to comply with the demands made upon them were fined and imprisoned. The greater part of the odium of these oppressions fell upon the archbishop, of whom the populace expressed their detestation in the most open way that they dared. On one occasion, viz. on May 9th, 1640, a paper was posted up, exhorting the London apprentices to attack the palace at Lambeth, but the archbishop having had timely notice of their intentions, frustrated their designs, and dispersed the multitude, amounting to the number of 500 persons. One of them was taken in the act of breaking the windows, and was cruelly put to death as a traitor, but this extreme severity only served to inflame the mob still more against the archbishop. Another circumstance which contributed to encrease the number of the archbishop’s enemies, was his continuing the convocation of the clergy after the dissolution of the parliament, by which he obtained several subsidies granted by the clergy, which the Commons had refused till their grievances were redressed. At length the necessities of the state obliged the king to call a new parliament, and,

as soon as it met, the canons and constitutions of the late convocation came before the house of commons. These, being discussed, were declared "to contain many matters contrary to the king's prerogative, to the fundamental laws and statutes of the realm, to the rights of parliament, to the property and liberty of the subject, and matters tending to sedition, and of dangerous consequence." In the course of the debates the archbishop's character was warmly attacked, and in some of the speeches he was charged with the treasonable design of subverting the religion and laws of the country. On the next day articles against the archbishop, presented by the Scotch commissioners, were read in the house of lords, and then reported to the house of commons, in a conference between the two houses. The resentment of parliament broke out into a flame, and a motion was made and carried that he had been guilty of high treason. Upon this, Denzil Hollis, son of the earl of Clare, was immediately lent up to the bar of the house of lords, to impeach him in the name of the Commons of England, to inform their lordships, that, in convenient time, they would bring up the particulars of their charge, and to request, that in the mean time he might be committed to safe custody. His grace being now commanded to withdraw, he requested leave to say "that he was heartily sorry for the offence taken against him, but humbly desired their lordships to look upon the whole course of his life, which was such, that he was very sure not one man in the house of commons did believe, in his heart, that he was a traitor." He was now committed to the custody of the gentleman usher of the black rod; and on the 26th of February, fourteen articles were brought up from the Commons by sir Henry Vane, the younger. He was then committed to the Tower, and in his passage thither he had to undergo the loud and deep curses of an enraged populace. One of the first steps taken against him was levying upon his property a fine of twenty thousand pounds, for his proceedings in the convocation held in 1640. In June 1641, he resigned the chancellorship of the university of Oxford, and in the following October, the house of lords sequestered his archiepiscopal jurisdiction. His confinement in the Tower was very severe, and he began to feel in his own person such sufferings as must bring to his recollection what he, in the day of his power, had inflicted upon others. After an imprisonment of nearly three years, he was brought to trial upon the fourteen articles already mentioned, and upon ten additional ones, which were now, for the first time, brought forward. Many of the charges were ill supported, and much of the evidence was trifling and irrelevant. It sufficiently appeared, however, that he had laboured to extend the royal prerogative and the ecclesiastical power, to a degree that was utterly inconsistent with the liberties of the people; that he had been zealous in enforcing the illegal claim of ship-money; that he had committed persons to prison, and punished them without law; and that he had been guilty of many arbitrary, illegal, and cruel actions. Archbishop Laud defended himself with uncommon spirit, eloquence, and acuteness, and with extraordinary presence of mind. His counsel in their defence endeavoured to shew, that if the charges were true, they did not amount to treason by any established law of the kingdom. This justification had its weight, and the lords, who were staggered by the plea, deferred giving judgment, till the Commons thought fit to bring in a bill of attainder, which was, after much delay, passed. To stop the consequence of this, the archbishop presented the king's pardon under the great seal, but it was over-ruled by both houses. By this bill the archbishop was condemned to suffer death, as in cases of high treason, and

all the favour he could obtain was to have his sentence altered from hanging to decapitation. He met his death with great firmness on Tower hill, on the 10th of January, being then in the seventy-second year of his age. Mr. Hume, in speaking of the learning and morals of archbishop Laud, says "he was virtuous, if severity of manners, and abstinence from pleasure, could deserve that name. He was learned, if polemical knowledge could entitle him to that praise." In his government of the church, it has been justly observed, he displayed a total want of charity towards those who made the least opposition to the doctrines and ceremonies established by authority; and under his countenance, the star-chamber wore all the horrors, and exercised all the cruelties, of an inquisition. In state affairs his counsels were high and arbitrary, and he was very active in promoting those measures which ultimately proved his own ruin, and that of the king. He was in some cases generous and munificent: besides what he did for Oxford in her buildings and library, he founded an Arabic lecture, which began to be read in 1636, and he invited the university with many new privileges. He procured a charter for the town of Reading, founded in it an hospital, and endowed it with a revenue of 200*l.* per annum. The archbishop published some single sermons, which have been reprinted since in an octavo volume. He printed a conference between himself and the Jesuit Fisher. His diary has been printed since his death; and in the year 1700, was published "An historical Account of all the material Transactions relating to the University of Oxford, from Archbishop Laud's being elected Chancellor, to his Resignation of that Office," written by himself. His letters to Gerard John Vossius were printed in London in 1690, and some others may be found at the end of Dr. Parr's Life of archbishop Usher. Biog. Brit. Toulmin's Edit. of Neal. Hume.

LAUDA, in *Geography*, a town of the duchy of Wurzburg, on the Tauber; 28 miles S.S.W. of Wurzburg.—Also, a town of the duchy of Warfaw; 20 miles S.E. of Gnesna. It is called Laudica.

LAUDAMNAT, a town of Bengal; 12 miles S. of Nattore.

LAUDANUM, a name given by the chemists to certain preparations, chiefly extracts of opium, on account of their excellent qualities; the word being derived from *laudare*, to praise.

The "laudanum liquidum" of Sydenham, Thebaica tinctura, or wine of opium of the London Pharmacopœia of 1809, is prepared by macerating for eight days 1 oz. of extract of opium, bruised cinnamon bark and bruised cloves, of each a dram, in a pint of wine, and straining. It is observed, that the degree of narcotic power of this preparation is nearly the same as that of the ordinary tincture of opium, from which it differs, in having the extract for its basis, in the addition of aromatics, and in the vehicle employed. The extract of opium, it is supposed, produces less consequent affection of the brain and nervous system than crude opium, and the same effect seems to be further obviated by the aromatics which are joined to it. This is a composition of the same articles, in different proportions, as the Tinctura thebaica of P. L. 1745, and as the celebrated liquid laudanum of Sydenham. This is still in use, and it possesses such advantages by the modification of opium it affords, as to justify being restored to the Pharmacopœia. See OPIUM.

LAUDAVA, in *Geography*, a town of Prussia, in the palatinate of Culm; 20 miles N.E. of Thorn.

LAUDER, a royal borough, in Berwickshire, Scotland, is situated on a river of the same name, about 22 miles to the south of Edinburgh, and 24 from Berwick. It is

now only a place of a mean appearance, and entirely destitute of trade. Formerly, however, it was a place of very considerable note. It was constituted a royal borough at a very early period, and for many years was distinguished as the residence of royalty, and the seat of the Scottish parliament. In the reign of king James III., when the parliament was convened to consult upon the means of repelling the English invasion, the nobility were so enraged at the conduct of the favourite minister, sir Robert Cochrane, that they hung him and his associates over Lauder bridge, in presence of the king and his army. This town has five fairs during the year. It joins with Haddington, Salburgh, Dunbar, and North Berwick, in sending a representative to parliament. Near the town, on the side of the river, is Lauderfort, built by Edward I. of England, and now the principal seat of the earl of Lauderdale. In this mansion are several noble apartments, rich in stucco work. One of them is very carefully preserved, as a curious example of the taste of the age in which it was made. Many vestiges of ancient Pictish camps can still be distinctly traced in this neighbourhood. Several tumuli, also, are visible on Lauder-Muir, which has probably been the scene of some battles in ancient times, as many fragments of swords, bows and arrows, &c. have been dug up from this place. On a rising ground, not far from the town, are the remains of a Roman station, in which a number of coins of that people have been found at different periods. Some ancient Spanish, English, and Scottish coins have likewise been discovered in different fields in this vicinity. The soil in the parish of Lauder is light and sandy, and in a high state of cultivation. The country rises gradually from the river, on both sides, to hills of a moderate height, which afford excellent pasture for sheep. Copper ore has been discovered in different spots, but is not rich enough to admit of being wrought with any prospect of advantage. Slate is also in plenty, but of an inferior quality. Adderstones and arrowpoints of flint, commonly called *elf*, or *faery arrows*, and several other stones of the most fanciful shapes, are found here after heavy rains. The whole parish, according to the parliamentary returns in 1800, contained 349 houses, inhabited by 1760 persons. Sinclair's Account of Scotland, vol. i. by the Rev. Dr. James Ford.

**LAUDI SPIRITUALI**, *Ital.* the most ancient melodies that can be found in Italy, set to Italian words. It was the opinion of Father Mencltrier (sur les Drames en Musique) that hymns, canticles, and mysteries, in the vulgar tongues of Europe, had their origin from the pilgrims who went to the Holy Land. St. Francis d'Assise, born 1182, is mentioned by Crescimbeni, and other Italian writers, among the first pious persons of that country who exercised their genius in composing hymns and spiritual songs, called *Laudi*, in the form of canzonets. *Le Laudis*, which were likewise called *lalde*, *lodi*, *cantici*, or *canticles*, are compositions in praise of God, the Virgin Mary, or the saints and martyrs. They resemble hymns as to the subject, but not the character and verification: hymns having been originally constructed on Greek and Roman models; but the *laudi*, or spiritual songs, are entirely of Italian invention.

A society for the performance of these religious poems was instituted at Florence so early as the year 1310, the members of which were called *laudisti*, and *laudisti*. In the fifteenth century this species of sacred poetry was very much esteemed and practised, as is manifest by the various collections that were made of them, one of which was printed 1485. In the next century several volumes of them were published, among which there are many poetical compositions on sacred subjects by Politian, Bembo, Lodovico Martelli, and other eminent poets. (*Quadrio*, *Storia d'Ogni Poef*

rol. ii. p. 466.) In the 17th century, though their favour was somewhat diminished, yet, besides a large volume composed by Serafino RAZZI, and published by the author, 1608, there were many collections of these spiritual songs printed.

Crescimbeni tells us that the company of *laudisti* of St. Benedicet, at Florence, went to Rome during the time of the grand jubilee, in the year 1700, and sung through the streets in procession several ludi that were written by the celebrated Filicaja. In most of the ancient collections, the melodies were prefixed to each of these songs. They were at first little more than chants, and without base. However, according to the commentary on Boccaccio, by Sanfovino, published at Venice, 1546, they were afterwards sung in many different parts. "There are in Florence," says he, "several schools of artizans and mechanics, among which are those of Orfanmichele, and Santa Maria Novella. Every Saturday after nine o'clock these assemble in the church, and there sing five or six ludi, in four parts, the words of which are by Lorenzo de Medici, Pulci, and Giambellari; and at every ludi they change the singers, and to the sound of the organ discover a madonna, which finishes the festival. And these singers, who are called *laudisti*, have a preceptor, whom they denominate their captain or leader."

This company still subsisted in 1770, when we frequently heard them sing their hymns, through the streets, in three parts, and likewise in their church, accompanied by an organ. Of the antiquity of this institution, as a MS. volume of *Laudi Spirituali*, which we found in the Magliabecchi library at Florence, is an indisputable proof, the preface, and a specimen of those ancient melodies, bearing date MCCCXXVI. have been inserted in the General History of Music, vol. ii. p. 327.

**LAUDICOENI**, among the Romans, formed of *laus*, praise, and *cena*, supper or entertainment, applauders, or persons who, for a reward, attended the rehearsal of plays and orations, in order to raise, or join in the acclamation. See ACCLAMATION and APPLAUSE.

**LAUDON**, GIBSON ERNEST, baron, in *Biography*, was descended from a respectable family, originally from Scotland, a branch of which settled in Livonia, and there purchased an estate at Totzen, where the subject of the following article was born in 1716. He displayed, at an early age, a strong inclination for a military life, and being instructed with this view, he entered, at the age of fifteen, into the Russian army as a cadet, and, in 1733, he was at the taking of Dantzic, where the king of Poland had sought refuge, in consequence of the disturbances which then prevailed in that country. He served three campaigns under count Munich against the Turks, and was present at the taking of Azof, Oczakow, and Chotzim. On the restoration of peace, he staid some time at Petersburg, in hopes of higher promotion, but being disappointed in his expectations, he went to Vienna, and was appointed by the empress queen to a command in the corps of Pandours, then raised by baron Trenk, and with these he proceeded to Bavaria. While he belonged to this corps he was severely wounded, and taken prisoner by the French, but was rescued by his own corps before his wound was healed. After this he was engaged much in active service, but he employed every leisure moment in the study of the military art, and in preparing himself for the active situation in which he was afterwards placed in the seven years' war. In 1754, he was employed to reduce to obedience the rebellious Croats, which he did rather by his judicious conduct than by force of arms. During the seven years' war, which commenced in 1756, he performed the most noble exploits, which we cannot in this place give in detail. Towards the close of that war, he

termed to make an attack on Schweidnitz. The night appointed for the execution of this plan was the 30th of September. Every preparation being made, Laudon harangued his soldiers, forbade them, under the severest penalties, to plunder the town, and promised, in case of their obedience, to distribute among them the sum of 100,000 rix-dollars. The guards exclaimed with one voice, "No, general, lead us on to glory, we do not want money." At two in the morning the signal was given, and the first assault made, and in four hours Laudon was in possession of the whole fortrefs. Although this achievement had been undertaken without the order of the Aulic council, the empress congratulated the victor in a letter written by her own hand, and sent him her picture set round with diamonds. On the conclusion of peace in 1763, the general retired to his estates in Bohemia, but in 1766 the empress appointed him a member of the Aulic council of war, and in the following year he was elected a member of the equestrian order of the empire, and in 1769 he was made commander-in-chief in Moravia. In 1770, when Frederic the Great paid a visit to the emperor Joseph at Neustadt, the principal officers were invited to dine with the two monarchs. As the company were about to place themselves at table, his Prussian majesty said to Laudon, "come general, and sit near me, I would rather have you by my side than opposite to me." In the war of Bavaria, in 1778, he was promoted by the emperor to be field-marshal, and entrusted to the command of the Austrian army, which amounted to 50,000 men. The plans which he formed to counteract the designs of the enemy were worthy the reputation which he had before acquired. After the peace, Laudon again retired to his estates, from whence he was again called, on the breaking out of the Turkish war, in 1788. He had the command of the grand army when it was resolved to reduce Belgrade; the archduke Francis was to be present at the siege, and the emperor, in a letter to Laudon, said, that "his nephew could not be in a better school than under his Gideon." The attack commenced on the 15th of September, and on the 30th it was determined that the place should be carried by storm. The assault began about nine in the morning, and at one of the outworks was in possession of the besiegers. The fortrefs still refused to capitulate; but, after a dreadful bombardment, by which most of the enemy's cannon were silenced, the place surrendered. In consequence of this achievement, he was appointed generalissimo of the whole Austrian army, an office which had been conferred on no person since the time of prince Eugene, and which gave him an unlimited controul over all the Austrian generals, and even over the Aulic council of war. On his return to Vienna, he was received with every mark of distinction that his sovereign and the people, by whom he was idolized, could bestow. After the death of the emperor Joseph, he was confirmed in all his appointments by his successor Leopold, who continued the war; soon after this he was taken ill of a fever, of which he recovered, but having imprudently rode out, contrary to the advice of his physicians, he was seized with a suppression of urine, which put an end to his life in the month of June following. This great general was beloved by his troops, who, under his command, believed themselves to be invincible. The most striking feature in the character of Laudon was that dauntless presence of mind, combined with daring intrepidity, so essential to the hero, and which can turn to the best advantage any unexpected opportunity that occurs. Joseph II. had a bust made of him, to be erected in the hall of the Aulic council of war, with the following inscription, "Gideonis Laudoni, summi castrorum praefecti, semper strenui, fortis, felicis militis, et civis optimi exemplum, quod duces militaeque imitantur, Josephus II. Aug. in ejus effigie proponi

voluit, anno 1783." After the capture of Belgrade, the emperor took from the family repository of the house of Austria the large star of the Theresian order, and sent it to Laudon, with permission for him to wear it on his breast; though by the statutes it could only be worn by the grand master of the order. Gen. Biog.

LAUDS, LAUNES, the second part of the ordinary office of the breviary, said after matins, though, heretofore, it ended the office of the night.

The laudes consist principally of psalms, hymns, &c. whence they took their name, from *laus, laudis, praef.*

LAVELANET, in *Geography*, a town of France, in the department of the Arriège, and chief place of a canton, in the district of Foix; 12 miles N.E. of Tarascon. The place contains 1200, and the canton 12,831 inhabitants, on a territory of 327½ kilometres, in seven communes. N. lat. 42° 56'. E. long. 1° 55'.

LAVELLO, a town of Naples, in Basilicata, the see of a bishop, suffragan of Bari; six miles N. of Venofa.

LAVEN, a small island near the E. coast of Luçon. N. lat. 14 12'. E. long. 124 6'.

LAUENAU, a town of Westphalia, in the principality of Calenberg; 15 miles N. of Hameln.

LAUENBURG, a town of Hinder Pomerania, and chief town of a lordship of the same name, situated on the Lehe; 36 miles W. of Dantzic. N. lat. 54° 32'. E. long. 17° 42'.—Also, a town of Germany, in the duchy of Saxe-Lauenburg, on the right coast of the Elbe, built by Henry the Lion. Here is a toll on the Elbe; 30 miles S.E. of Hamburg. N. lat. 53° 22'. E. long. 10 48'. See SAXE-LAUENBURG.

LAVENDER, in *Agriculture*, a small shrubby plant, sometimes cultivated in fields near large towns for the spikes of flowers, which are either sold in small bundles, or distilled for lavender-water, and the essential oil of the plant.

The common spike lavender is mostly employed with this intention. According to some the method of cultivating it is by planting the slips or cuttings of the young shoots, after being struck, in rich shady borders or nurseries the preceding spring, about September or October, in rows, two, three, or more feet distance from each other, and about the same distance apart in the rows, the ground being kept clean by digging or hoeing in the spring or autumn, and the plants retained in order by proper pruning. And as they decay from age or other accidents, they are replaced from the nurseries; the slips of such plants as are wearing out being made use of for the purpose. The spikes of flowers begin to get ripe and ready for gathering about the end of June or July, when it is collected by women and children by cutting off the heads and tying them up in bundles, so as to be sent to the still-house, or other places, in proper baskets. When, for distilling, the lower parts of the stems are then cut off and the heads put into the still.

But this plant, when cultivated in the field, should, according to others, have the ground well prepared by digging, or repeated ploughing and harrowing; after which, in the spring season, as about March or beginning of April, a proper quantity of slips or cuttings of the young shoots or branches should be provided, and planted at once by means of a dibble, in rows of not more than two and a half or three feet apart, and one and a half or two feet distant in the rows, closing the mould well about them. They afterwards require to be kept clean by means of the hoe, and to have the mould brought up to them occasionally, particularly in the autumn, and the dead stems or leaves cleared away.

They will mostly afford spikes of flowers in plenty in the second summer, after being thus planted out.

Lavender succeeds best where the soil is rather of a dry quality, and not too stiff. In some parts of the southern districts near London, it is grown in the fields with much profit.

In the Agricultural Survey of Berkshire, it is stated, that the late field-marshal Conway, about twenty years ago, formed a large lavender plantation, and erected proper apparatus for its management at Park-place, near Henley. "There are about twenty acres planted with lavender, on the side, and at the bottom of a chalky hill, with a south-western aspect. The land at the bottom is very good, but that on the slope has only a thin covering of mould over the chalk, and the difference of soil is strongly marked by the luxuriance of the plants they respectively bear."

It is of such importance to keep crops of this sort perfectly clean, that three men are constantly employed in weeding this plantation; who, occasionally, use small hand-hoes, but not much, as they are liable, without great care, to break and injure the plants. When the state of the weather will not admit of this sort of business being done, they go over the plantation with large shears, and clip off all the stalks which were left by the lavender cutters.

Hot summers are very favourable to the productiveness of plantations of this kind.

LAVENDER, in *Botany*. See LAVANDULA.

LAVENDER *Cotton*. See SANTOLINA.

LAVENDER, *French*. See CASSIDONY.

LAVENDER, *Sea*, *Limonium*. See STATICE.

LAVENDER, *Hollow-leaved Sea*, or *Side-saddle Flower*. See SARRACENA.

LAUFENFRED, in *Geography*, a town of Westphalia, in Calenberg, on the Wefer; 15 miles N.W. of Gottingen.

LAVENHAM, a market-town and parish in the hundred of Babong, and county of Suffolk, England, was formerly considerable for its manufacture of woollen cloths and calimancoes. The making of yarn from wool is now, however, the principal employment of the inhabitants. The market is held here on Tuesday, and there are two fairs during the year; one for butter and cheese on the 10th of October, and another for horses on Shrove Tuesday. Six capital burghesses, chosen for life, constitute the governors of the town, and by them all the inferior officers are appointed. The land here is of that sort called Borough-English, whereby all heritable property descends to the youngest son, or, in default of issue, to the youngest brother. The town itself is agreeably situated on the banks of the river Brell, from which it rises in a gentle acclivity, and consists of nine streets or divisions, and a market-place, with a stone cross in the centre. At the south end stands the parish-church, one of the finest specimens of ancient ecclesiastical architecture in the county. This noble building was probably founded towards the close of the fifteenth century. Its walls are built of freestone, interspersed with very curious decorations of flint-work. On every side they exhibit a variety of arms of noble personages, who probably obtained that distinction by their benefactions towards the erection of the church. The inner roof is very finely wrought in carved work; and there are two pews of such exquisite workmanship, as to vie with any in Henry VIIIth's chapel. This town has, likewise, a meeting-house for Dissenters, two charity-schools, and two Sunday-schools, one of which is supported by the Dissenters. In the parliamentary returns for 1800, the houses are stated to amount to 339 in number, and the inhabitants to 1776 persons.

LAVENIA, in *Botany*, a genus formed by the late Dr. Solander, and adopted from his manuscripts by professor Swartz, of the *Cotula Verbesina*, and *Verbesina Lavenia* of

their common preceptor Linnæus. The name is of unknown origin, and suspected by professor Martyn to be vernacular in Ceylon. It first appears in the supplement to Ray's *Florida Plantarum*, v. 3, 217, on the authority of Sherard, for the species last mentioned, for which it was adopted by Linnæus as the trivial name. Whatever the derivation or meaning of this word may be, its euphony may uphold it, though, according to found principle, Swartz ought to have preferred *Adenostemma*, given to the same plant by the classical Forster, and constructed of *adon*, a gland, and *stemma*, a crown, the seed being crowned with three glands instead of the feather, hair or membrane appropriated to other genera of this family. Swartz. *Prod. Ind.* Schreb. 544. Willd. *Sp. Pl.* v. 3, 1724. Mart. *Mill. Dict.* v. 3. (*Adenostemma*; Forst. *Gen.* t. 45. Juss. 184.)—Class and order, *Syngenesia Polygamia-aqualis*. *Nat. Ord.* *Compositæ discoidæ*, Linn. *Corymbifera*, Juss.

*Gen. Ch.* *Common Calyx* ovate, somewhat imbricated, consisting of from 10 to 14 lanceolate, equal, permanent scales. *Cor.* compound, uniform, of from 15 to 20 equal hermaphrodite florets, which are funnel-shaped, dilated at the base, the limb in five regular spreading segments. *Stam.* Filaments five, thread-shaped, shorter than the tube; anthers oblong, flat-tish, didymous, slightly cohering laterally. *Pist.* Germen oblong; style thread-shaped, longer than its own corolla, deeply divided; stigmas flat-tish, club-shaped. *Peric.* none, except the permanent spreading calyx. *Seed.* rather club-shaped, slightly rugged, viscid with glands. Crown of three awl-shaped bristles, glandular at the tips. *Recept.* naked.

*Eff. Ch.* Receptacle naked. Seed-down of three bristles, glandular at their tips. Calyx ovate, slightly imbricated. Style divided.

Obf. Forster describes the florets as bearded or downy on their upper or inner surface.

1. *L. decumbens*. Decumbent *Lavenia*. (*Cotula Verbesina*; Linn. *Sp. Pl.* 1258. Mant. 473. *Chrysanthemum sylvaticum repens* minus, *chamædryos folio*, *floræ luteo* nudo, *femine rostrato*; Sloane *Jam.* v. 1. 262. t. 155. f. 2. *Tanaetum herbaricum erectum*, *foliis cordatis crenatis oppositis*, *capitulis paucioribus remotis terminalibus*; Browne *Jam.* 316. *Herb. Linn.*)—Stem decumbent. Leaves heart-shaped, obtuse, obtusely ferrated.—Native of the inland cool and shady woods of Jamaica. *Root* annual. *Stem* decumbent or prostrate, from nine to eighteen inches long, throwing out roots from the lower joints, simple, except now and then a short axillary shoot or two, leafy, nearly smooth, bluntly quadrangular. *Leaves* opposite, stalked, an inch or more in length and almost as broad, heart-shaped, nearly smooth, blunt, unequally and bluntly ferrated, three-ribbed, often cut away close to the lateral ribs at the base. *Flowers* few, terminal, convex, yellow, scarcely so large as a pea, on long, slender, in some degree panicled, stalks.

2. *L. erecta*. Upright *Lavenia*. (*Adenostemma viscosum*; Forst. *Prodr.* 54. *Verbesina Lavenia*; Linn. *Sp. Pl.* 1271. Swartz. *Obf.* 312. *Eupatoriophalacron scopulariaræ aquaticæ foliis oppositis*; Burm. *Zeyl.* 95. t. 42. *Pu-tumba*; Rheede *Hort. Mal.* v. 10. 125. t. 63.)—Stem erect. Leaves elliptical, pointed, sharply ferrated; tapering and entire at the base.—Native of Ceylon, the coast of Malabar in sandy ground, and the Society isles. *Root* annual, of many pale fibres. *Stem* a foot high, erect, somewhat branched, leafy, square, rough with ascending bristles. *Leaves* stalked, opposite, the uppermost less exactly so; all of a broad elliptical figure, tapering much at each end, three-ribbed, rough, two or three inches long, entire at the base, broadly and acutely ferrated upwards. *Flowers* on shortish, hispid, hoary, axillary stalks, accompanied by linear bractæ, and consisting

consisting of fewer florets than the preceding, of a palish blue colour, and externally downy.

**LAUVENSAR**, in *Geography*. See LAVANSARI.

**LAVENSTEIN**, or **LOEWENSTEIN**, a town of Germany, in the principality of Culmbach, near which is a copper-mine; 12 miles S. of Sanfeld.—Also, a town of Westphalia, in Calenberg; nine miles E. of Hanck.—Also, a town of Saxony, in the margravate of Meissen; 18 miles S. of Dresden. N. lat. 50° 42'. E. long. 13° 46'.

**LAVENZA**, a sea-port of Italy, in the department of the Apennines, with a harbour at the mouth of a small river; seven miles S.E. of Sarzana. N. lat. 44° 3'. E. long. 10° 1'.

**LAVER**, in *Botany*, perhaps from the verb to *lave*, alluding to its being washed up on the shore. See ULVA.

**LAVER Bread**, a sort of food made of a sea-plant, otherwise called the *oyster-green*, or *sea-liverwort*. It is said to be used in the county of Glamorgan, and other parts of Wales.

**LAVER**, in *Scripture History*, a sacred utensil placed in the court of the Jewish tabernacle, consisting of a basin, where they drew water by cocks, for washing the hands and feet of the officiating priests, and also the entrails and legs of the victims.

**LAVERNA**, in *Antiquity*, the goddess of thieves and cheats among the Romans, who honoured her with public worship, because she was supposed to favour those who wished that their designs might not be discovered. Varro says, that she had an altar near one of the gates of Rome; hence called Porta Lavernalis.

**LAVERNICK**, in *Geography*, a town of Prussia, in the territory of Culm, on the Drebenitz; 44 miles E. of Culm.

**LAVEZZO**, a name given by the Italians to a steatitic stone, of which vessels are made; called also *Lapis comensis* and *POTSTONE*, which fee.

**LAUF**, in *Geography*, a town of Germany, in the territory of Nuremberg; 8 miles E.N.E. of Nuremberg. N. lat. 49° 51'. E. long. 11° 13'.

**LAUFFEN**, a town of the archbishopric of Salzburg, on the Salza; 11 miles N.N.W. of Salzburg. N. lat. 47° 54'. E. long. 12° 52'.

**LAUFFEN**, a village and castle of Switzerland, which gives name to a bailiwick, in the canton of Zurich, near the Rhine, where is a celebrated cataract; 2 miles below Schaffhausen.

**LAUFFEN am Neckar**, a town of Wurtemberg, on the Neckar, formerly imperial; 16 miles N. of Stuttgart. N. lat. 49° 5'. E. long. 9° 18'.

**LAUFFEN**, a town of Prussia, in Natangen; 15 miles S. of Barteniten.—Also, a town of Austria, where the diet was held under Frederick I.; 18 miles S. of Gemunden.

**LAUFFENBURG**, a fortified town of Germany, and one of the four forest-towns of the late Austrian Swabia, situated on both sides of the Rhine, over which is a bridge; and at this place there is a fall in the river; 26 miles W. of Schaffhausen. N. lat. 47° 36'. E. long. 8° 4'.

**LAUFFON**, a town of France, in the department of the Upper Rhine, and chief place of a canton, in the district of Délémont, seated on the Barck; 16 miles N. of Soleure. The place contains 740, and the canton 7513 inhabitants, on a territory of 172½ kilometres, in 21 communes. N. lat. 47° 32'. E. long. 7° 20'.

**LAUGEON**, a town of Meckley; 42 miles W. of Munnypour.

**LAUGERIA**, in *Botany*, named by Jacquin, in honour of Robert Laugier, professor of botany and chemistry in the university of Vienna, where the botanic garden there was

first established. Jacq. Amer. 64. t. 177. f. 21. Linn. Gen. 102. Schreb 140. Willd. Sp. Pl. v. 1. 1081. Mart. Mill. Dict. v. 3. Juss. 206. Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Rubiaceae*, Juss.

Gen. Ch. Cal. Perianth superior, of one leaf, tubular, small, deciduous, unequal at the orifice. Cor. of one petal, falver-shaped; tube very long; limb in five obovate segments. Stam. Filaments five, very short; anthers linear, long, within the tube. Pyl. Germen nearly ovate, inferior; style thread-shaped, rather longer than the tube; stigma capitate. Peric. Drupa roundish, umbilicated with a small depression. Seed. Nut roundish, with five furrows, and from two to five cells.

Ess. Ch. Corolla falver-shaped, five-cleft. Stamina within the tube. Drupa inferior. Nut of five cells.

Obf. Vahl suggests that this genus might with propriety perhaps be united to *Guettarda*; see that article.

1. *L. odorata*. Linn. Sp. Pl. 276. Jacq. Amer. 64. (Edelchi; Loefl. It. 259. 271. 306.)—Leaves elliptic-lanceolate, pointed, nearly smooth. Stem somewhat spinous. Clusters panicled. Nut with five cells.—Native of South America; observed by Jacquin in exposed bushy places on the sea shore, about the Havana and Carthagen. The stem is shrubby, ten feet high, erect, branching, the branches opposite and widely spreading. Leaves opposite, on short stalks, from one to two inches, or more, in length, elliptic-lanceolate inclining to obovate, pointed, entire, veiny, described by Jacquin as smooth, but a young branch sent by him to Linnæus, from the Vienna garden, has numerous hairs on the leaves, especially at the rib and edges, and its footstalks, like the twig itself, are very hairy. *Stipulas* axillary, opposite, lanceolate, recurved. Clusters axillary, panicled, lax, as long as the leaves. Flowers dirty red, very fragrant at night. Fruit copious, larger than a pea, very black, soft, when ripe falling off on the slightest shaking of the bush.

2. *L. lucida*. Swartz Ind. Occ. v. 1. 475. Vahl. Symb. v. 3. 40. t. 57.—Leaves oblong, obtuse, membranous, shining. Clusters forked. Nut with two cells.—Native of bushy places, in the warmer parts of Jamaica, as well as in St. Lucia and Santa Cruz. A shrub with round, smooth, spreading branches. Leaves two or three inches in length, oblong, with a blunt point, shining, smooth on both sides. *Stipulas* axillary, ovate, acute, deciduous. Clusters from the bosoms of the upper leaves, so as to appear terminal, foliary, rarely opposite, the length of the leaves, either simply forked, or twice divided, widely spreading. Flowers nearly sessile in a simple row on each branch of the cluster, with a solitary intermediate one, whitish, fragrant. Fruit black, its nut of two unequal cells. Dr. Swartz thinks this may be the *Ipnotraguapin* of Loefl. It. 270, with the description of which it agrees in many respects, but he never observed any spines on his *L. lucida*. We have, nevertheless, no doubt of their being one and the same species.

3. *L. coriacea*. Vahl. Ecol. v. 1. 26.—“Leaves elliptic-ovate, rather coriaceous, smooth on both sides, bluish. Spikes twice divided. Flowers tetrandrous.” Found on the summits of mountains in the island of Montserrat, where it was probably found by Von Rehr. A shrub or tree, but we know nothing further concerning it.

4. *L. resinosa*. Vahl. Ecol. v. 1. 27.—“Leaves broad-lanceolate, smooth; glaucous beneath. Spikes axillary, cloven. Branches resinous at the summit.” Native of lofty mountains in Montserrat.

5. *L. tomentosa*. Swartz Ind. Occ. v. 1. 477.—“Leaves ovate, acute; downy beneath. Clusters forked. Nut of two cells.” Native of shrubby places in the western part of Jamaica. A small tree, twice the height of a man, with subdivided.

subdivided downy *branches*. *Leaves* shining and smooth above, silky and soft beneath. *Flowers* whitish. It blossoms in autumn, and resembles a *Tournefortia* in habit and inflorescence. *Swarz*.

LAUGHER, a name given to a particular species of pigeon, called by Moore the columbaridens. It is about the size of the common pigeon, and much of the same make; but it has a very bright pearl-coloured eye, almost white, and is a mottled red, or blue. They are said to be brought from Jerusalem, and the country thereabouts. When the cock of this species courts the hen, he has a guttural cooing, not unlike the gurgling of a bottle of water, when poured out hastily; and after this he always makes a noise not unlike laughing, from the singularity of which he has obtained his name.

LAUGHLI, *Lx*, in *Geography*, a fief of Piedmont, which takes its name from a mountain; formerly held immediately of the empire, ceded, in 1746, to the king of Sardinia, or duke of Savoy, and now annexed to France.

LAUGHTER, an action or passion peculiar to man.

Authors attribute laughter to the fifth pair of nerves, which sending branches to the eye, ear, lips, tongue, palate, and muscles of the cheek, parts of the mouth, præcordia, &c. there hence arises a sympathy, or consent, between all these parts; so that when one of them is acted upon, the others are proportionably affected.

Hence a favoury thing seen or smelt, affects the glands and parts of the mouth, a thing seen or heard, that is shameful, affects the cheek with blushes; on the contrary, if it pleases and tickle the fancy, it affects the præcordia and muscles of the mouth and face with laughter; if it causes sadness and melancholy, it likewise affects the præcordia, and demonstrates itself by causing the glands of the eyes to emit tears.

Laughter, according to Hobbes, is "a sudden glory, arising from a sudden conception of some enmity in ourselves, by comparison with the infirmity of others, or with our own formerly." Dr. Campbell, on the contrary, maintains, that this emotion doth not result from the contempt, but solely from the perception of oddity, with which the passion is occasionally, not necessarily, combined. See **RIDICULE**.

L'Augier, Monsignor, in *Biography*, principal physician to the imperial court at Vienna in 1772; the most intelligent and best informed critic, among musical dilettanti, with whom we ever conversed. He had been in France, Spain, Portugal, Italy, and Constantinople, and was perfectly well acquainted with national styles of music, and the peculiar merits and defects of individual composers throughout Europe. This gentleman, in despite of uncommon corpulency, possessed a most active and cultivated mind. His house was the rendezvous of the first people of Vienna, both for rank and genius, and his conversation was as entertaining as his knowledge was extensive and profound. Among his other acquisitions he had arrived at great skill in practical music, had a most refined discriminating taste, and could give, vocally, specimens of the *national melody*, which he had heard with philosophical ears wherever he had been; in fine, he was a living history of music. In Spain he had been intimately acquainted with Dominico Scarlatti, who, at seventy-three, composed for him a great number of harpsichord lessons, the chief of which had never been printed. The book in which they had been transcribed contained forty-two pieces, among which were several *slow* movements, with which, for want of fortissimo and expression, in the old harpsichords, he seldom enriched his works. These lessons were composed in 1756, when Scarlatti was too fat to cross his hands, as he used to do; so that these are not so difficult

as his more juvenile works, which were made for his pupil and patroness, the late queen of Spain, while she was infanta of Portugal. M. L'Augier used to relate, that the empress queen Theresa had been a very notable musician, and that some years ago he had heard her sing very well. In the year 1739, when she was only twenty-two years of age, and very handsome, she sung a *duo*, with old Senefino, at Florence, so well, that by her voice, which was then a very fine one, and graceful and steady manner, she so much captivated the old man, that he could not proceed without shedding tears of satisfaction. Her imperial majesty had so long been a performer, that she one day, in pleasure, told the old Faustina, the wife of Haffe, who was then upwards of seventy, that she thought herself the first (meaning the oldest) virtuosa in Europe; for her father, at a rehearsal, brought her on the court stage at Vienna, when she was only five years old, and made her sing a song.

Metafasio, in a letter to Farinelli, calls M. L'Augier Monsignore, the physician of the pope, and we suppose the imperial physician is qualified with the title of Monsignore, my lord. The imperial Laurat tells Farinelli, that Monsignor L'Augier is charmed with him, with his heart, and with his conduct. And sporting with his rotundity, he says, "he often visits me, in spite of his immeasurable corpulency, and mounts to the altitude where I reside, with the lightness of the most slim dancer. I shall, for your sake, embrace as much as possible of his majestic circumference." This extraordinary personage, with a mind proportioned to his body, died at Vienna in 1774, to the great loss of society in that city, and of sound criticism and good taste.

LAVIANO, in *Geography*, a town of Naples, in Principato Citra; 27 miles E. of Salerno.

LAUJAR, a town of Spain, in Grenada; 18 miles N.W. of Almeria.

LAVIGEN, a town of Norway, in the diocese of Drontheim; 24 miles N. of Drontheim.

LAVIGNON, a name which the fishermen of the vicinity of Rochelle give to a shell-fish, which is used for food in that place, and is probably a species of *Solen*. It is common on the coast of Poitou, and has a very thin pair of shells for its covering, and which never can shut close, in the manner of the ciler or muscle, or other common bivalve shells: the fish, therefore, always buries itself in the mud by way of security. The shells are very smooth and polished, especially on the inside, and they are naturally white. This colour they always retain within, though their outer surface is often tinged black by the mud.

They are often buried five or six inches deep in the mud, but it is always easy to know where they are, because they must keep a free communication with the water above; by means of a round aperture, of about a tenth of an inch diameter, which opens from the surface of the mud to every shell-fish. When the shells of this fish are opened to their utmost width, it is easy to see a sort of arm with which each is furnished, in the manner of the common muscle, for its progressive motion. This part serves them to bury themselves in the mud, and to raise themselves out of it again, when they are inclined to seek a new habitation; into which they make their way in a more speedy manner than would easily be thought.

When the creature is plunged to its proper depth under ground, it receives the benefit of the water above, by means of two pipes, or proboscides, which have each a double aperture at their ends. These take in water, and throw it out again, alternately, for the uses of the animal, and either of the two is indifferently qualified to answer either purpose. The fish has a power of lengthening, or shortening these pipes

pipes at pleasure, and, when it pleases, takes them wholly into the shell. Mem. Acad. Par. 1710.

LAVIN, in *Ornithology*, a name given by the people of the Philippine islands to a species of hawk, a bird of great beauty, being variegated all over with yellow, black, and white. They call it also *scub*.

LAUINGEN, in *Geography*, a town of Bavaria, in the principality of Neuburg, on the Danube, supposed to have been a Roman colony; six miles above Hockfleit. N. lat. 48° 32'. E. long. 10 22.

LAVINGTON, EAST, or *Market Lavington*, a market-town and parish in the hundred of Swanborough, and county of Wilts, England, is situated at the northern termination of Salisbury plain. It was formerly called Steeple, or Staple, Lavington, and was a considerable town; having acquired the name of Cheaping, or Market Lavington, from its great corn market, which was established early in the sixteenth century, but is now much decreased, as the chief resort of the dealers is to Devizes. East Lavington is 8½ miles from London; the markets were on Monday and Wednesday. The population, as returned to parliament in 1800, was 918; the number of houses 167. Bishop Tanner, the celebrated author of "Notitia Monastica," was born in this town in 1674.

*West, or Bishop's Lavington*, is a parish within two miles of the foregoing, but is situate in the hundred of Whorlston; it was returned, in 1800, as containing 214 houses, and 978 inhabitants. Britton's Beauties of Wiltshire, 8vo.

LAVINIUM, in *Ancient Geography*, a small town of Latium, exactly S. of Rome, and eight miles S.E. of Laurentum, near the sea-coast, on the rivulet Numicus, between the mouth of which, and the Tiber, Æneas is supposed to have landed. According to Strabo, he built this town after the defeat of Turnus, king of Ardea; thus perpetuating his victory and the name of his wife Lavinia, daughter of king Latinus. According to the same author, he erected here a temple of Venus, the care of which he committed to the Ardeates. But as this city was not strong enough to resist the assaults of his enemies, who were jealous of his power, he built another on an eminence, E. of the first. See LANUVIUM.

LAVINO, in *Geography*, a town of Italy, in the Milanese; 18 miles W.N.W. of Como.—Also, a town of Naples, in the Molise; 24 miles N.E. of Molise.

LAVIS, a town of Tyrol, at the union of the rivers Lavis and Adige; eight miles N. of Trent.

LAVIT DE LOMAGNE, a town of France, in the department of the Gers, and chief place of a canton, in the district of Lectoure; 12 miles E. of Lectoure. The place contains 1330, and the canton 7606 inhabitants, on a territory of 10½ kilometres, in 15 communes. N. lat. 43 57'. E. long. 1°.

LAUKAS, a town of Sweden, in the government of Wafra; 124 miles E.S.E. of Wafra.

LAUKOWITZ, a town of Bohemia, in the circle of Bohehau; 10 miles N.N.E. of Jung-Buutzel.

LAUNAY, PENEU, in *Biography*, was born at Blois in the year 1573, and having considerable family interest, he obtained, in early life, a post under government, and was made secretary to the king. These honours he willingly renounced, in order that he might devote his time to the study of the sacred writings. His works prove how diligently he followed his new profession. He acquired the respect and esteem of the French Protestants, and he was chosen deputy to all the synods of his province, and to almost every national synod which was held in his time. He died in 1662, at the age of eighty-nine years. His works are paraphrases on the

books of Proverbs, Ecclesiastes, the prophet Daniel, all the epistles of St. Paul, and the Apocalypse, which were published at different periods. He published likewise "Remarks on the Bible, or an Explanation of the different Words, Phrases, and Figures of the sacred Writings;" and "A Treatise on the Lord's Supper."

LAUNCE, in *Ichthyology*. See AMMODYTES.

LAUNCEGAYS, in our *Old Writers*, a kind of offensive weapons now disused, and prohibited by the statute 7 Rich. II. cap. 13. Many of the commentators on our ancient laws profess themselves unable to explain what kind of weapons these were. Grose suggests, that the term lancegay may be a corruption of the words lance aigue, a sharp or pointed lance; and if the intention of the acts be considered, it will justify, in a degree, this supposition; as they were evidently framed to prevent those violent affrays that frequently arose among the gentry of that time, commonly attended by a numerous suite, who, if armed with mischievous weapons, might have spilt much blood. A lance fit for war was, perhaps, termed sharp, or pointed, in opposition to a blunt or tilting lance. See LANCE.

LAUNCESTON, in *Geography*, a populous borough and market-town in the hundred of East, and county of Cornwall, England, is situated on an eminence, at the distance of one mile from the river Tamer, near the central part of the eastern side of the county. Its ancient name was Dunheved, the Swelling Hill; but the present appellation, according to Borlase, signifies the "Church of the Castle." The castle is the most important object in the town, to which, in all probability, it gave origin. Its mouldering walls surround and cover a considerable extent of ground, and prove it to have been a fortress of great strength and importance. The principal entrance was from the south-west, through a fortified passage upwards of an hundred feet in length, and ten in breadth. At the end of this stood the great gate, the arch of which was pointed, but is now in ruins. This led to a smaller gate, with a round arch, opening into the baſe court, which formed a square of 136 yards, surrounded by thick walls and fortified with a deep ditch. At the south-west angle was a very strong round tower, whence a terrace extended to the keep or citadel at the south-east angle of the court. This consisted of an immense artificial hill, nearly ninety feet in perpendicular height, about 300 feet diameter at its base, and 93 at its summit. The ascent to this keep originally commenced at a semi-circular tower, and continued to the top through a covered way, seven feet wide, now in ruins. The keep consists of three wards, and is surrounded by a circular wall. The thickness of the outer wall, or parapet, is about three feet; the second wall is six feet from the former, nearly four times the thickness, and considerably higher. About eight feet within this wall is another, ten feet thick, and thirty-two feet high from the floor of the inclosed area, the diameter of which is about eighteen feet. In the baſe court formerly stood the county gaol, a spacious assize court, a chapel, and other buildings; but these have all been taken down, except the gaol, which retains its situation near the bottom of the hill. The building of this castle has been generally attributed to William, earl of Moreton and Cornwall, in the time of William the Conqueror; but this opinion is probably erroneous, as the style of workmanship exhibited in several parts of the remains, is apparently of a much earlier date. The walls of the keep, in particular, have every appearance of being considerably more ancient; and from a retrospective view of events that have occurred in this county, the conjecture appears to be fully warranted that the foundation of the castle is as remote as the time of the Britons. The era

in which the town was founded, or, at least, began to assume a regular form, is better determined; this was about the year 900. No remains of the original buildings are now extant. On the north side of the town was a priory of Augustinian monks, said to have been established by Warlewast, bishop of Exeter. As this town was a principal residence of the earls of Cornwall for many years after its foundation, its consequence continually increased, and many liberties and privileges were granted to its inhabitants. Soon after the conquest a weekly market was established on Sunday; in the reign of king John, the townsmen paid five marks for the removal of the market to Thursday, but it has since been changed to Saturday. In the reign of Henry III. Launceston was made a free borough by the king's brother, Richard, earl of Poitiers and Cornwall; he also granted the inhabitants some additional immunities, which were confirmed by several subsequent charters; and in the reign of Richard II. the assizes were ordered to be held at Launceston, and "no where else." This regulation was observed till the first year of George I. when an act was passed empowering the lord chancellor to appoint any other place in the county. Since that period the winter assizes only have been held here; those of the summer having been removed to Bodmin. By a charter of Philip and Mary, granted in 1555, which enumerates and confirms the various prior charters, the government is vested in a mayor, recorder, and eight aldermen, who, with the free burgesses, have the right of electing the parliamentary representatives. The whole number of voters is about twenty. This borough made its first return in the twenty-third of Edward I. and had a mayor as early as the time of Edward IV. Near the centre of the town is the church of St. Mary Magdalen, a handsome fabric, built with square blocks of granite, most of which are enriched with carved ornaments, executed in a very singular manner. At the west end is a lofty tower; and a figure of the Magdalen, in a recumbent posture, is placed in a niche at the east end. This church was originally only a chantry chapel; in the reign of Henry IV. it was re-edified and considerably enlarged; in Henry VI.'s reign it was constituted a parish church, and was again rebuilt in the time of Henry VIII. The town was formerly surrounded by a wall, of which some parts still remain. The streets are narrow; but the houses are well built; on the south side is a fortified gateway, containing an apartment used as the town gaol. The children of the poor are educated in two charity-schools maintained by voluntary subscription; and a free-school founded and endowed by queen Elizabeth. Launceston is distant from London 213 miles; has a weekly market on Wednesday, besides that on Saturday already mentioned, and six annual fairs; the return to parliament in the year 1801 stated the population to be 1483, the number of houses 226. The houses of this town are connected with those of Newport, which is a borough, though apparently only part of Launceston. See NEWPORT.

About two miles north of this town is Werrington, a seat of the duke of Northumberland. Polwhele's History of Cornwall, 4to. Beauties of England and Wales, vol. ii.

**LAUNCH**, in *Ship Building*, is the slip or descent whereon the ship is built, also the whole machinery used in launching.

To facilitate the operation of launching, the ship, when she is first built, is supported by strong platforms, laid with a gradual inclination to the water, on the opposite sides of her keel, to which they are parallel. Upon the surface of this declivity are placed two corresponding ranges of planks, which compose the base of a frame, called the *cradle*, whose

upper part envelops the ship's bottom, to which it is securely attached. Thus, the lower surface of the cradle, conforming exactly to that of the frame below, lies flat upon it, lengthways, under the opposite sides of the ship's bottom; and as the former is intended to slide downwards upon the latter, carrying the ship along with it, the planes or faces of both are well daubed with soap and tallow. The necessary preparations for the launch being made, all the blocks and wedges by which the ship was formerly supported, are driven out from under her keel, till the whole weight gradually subsides upon the platforms, which are accordingly called the ways. The shores and staunchions, by which she is retained upon the stocks till the time of launching, are at length cut away, and the screws applied to move her, if necessary. The motion usually begins at the instant when the shores are cut, and the ship slides downward along the ways, which are generally prolonged under the surface of the water to a sufficient depth, to float her as soon as she arrives at the farthest end thereof. When a ship is to be launched, the ensign, jack, and pendant, are always hoisted, the last being displayed from a staff erected in the middle of the ship. Ships of the first rate are commonly constructed in dry docks, and afterwards floated out, by throwing open the flood-gates, and suffering the tide to enter, as soon as they are finished. Falconer.

**LAUNCHING**, the act of conveying the ship into the water after she is built.

**LAUNCHING-Draft of Water**, the depression of the ship, when first launched below the water's surface.

**LAUNCHING-Planks**, form the upper surface of the platform on each side the ship, whereon the buldgeways slide in the act of launching the ship.

**LAUNDER**, in *Mineralogy*, a name given in Devonshire, and other places, to a long and shallow trough, which receives the powdered ore, after it comes out of the box, or coffer, which is a sort of mortar, in which it is powdered with iron pestles.

The powdered ore, which is washed into the launder by the water from the coffer, is always finest nearest the grate, and coarser all the way down. See **BUBBLE** and *Dressing of ORE*.

**LAUNDRY**, as if *Lavanterie*, Fr. the room in which clothes are washed; or, in a more restricted and appropriate sense, as the term is used in the subsequent article, it denotes the place where clothes are mangled, dried, and ironed. Under this head we shall include the *wash-house*, as it is necessarily connected with the laundry. Washing and getting up linen are employments of great importance in most families, and they have engaged the attention of many ingenious mechanics, who have contrived various washing-machines for the abridgment of labour and expence in this department of domestic economy. Most of the machines hitherto used are objectionable on many accounts, but principally because they operate by *friction*, instead of *pressure*. When the linen is properly prepared for washing, it may be thoroughly cleaned by *pressure* only. Rubbing it with the hands, or by any machine that operates by friction, injures it more than the wear it sustains in actual use. Hence it follows that the best method of cleaning foul linen is, first, to prepare it for the operation by soaping it where necessary, and putting it into soak for at least twelve hours. This will loosen the filth, and decompose the grease and other matter with which it is soiled, and it will then be readily removed by alternately soaking, and squeezing or pressing. The desideratum, therefore, is, to construct a machine that would, by a rotative motion, or an up-and-down stroke, (like pumping) alternately press and saturate the linen with

## L A U N D R Y.

the fuds, and lally with clear water. The machine that comes nearest to this, of any that has fallen under our notice, is one invented by Mr. Gould.

We shall now describe a wash-house and laundry, constructed upon scientific principles by John Bentley, esq. the present possessor of Highbury House, near London, being the completest of the kind we have met with.

The wash-house is 24 feet long, nine feet broad, and eight feet high. It is furnished with a filtering machine, a cistern for filtered water, two coppers, a copper cullender, a jack with pulleys, six washing tubs, a stone sink, a table, a wringing machine, and a pump of hard water.

The floor is rough Yorkshire-stone, laid upon a sharp current. Over two-thirds of the roof is a lead cistern containing 40 hogheads of rain water, supplied from the adjoining buildings. The other third of the roof is conical, surmounted with a cylinder for a steam-vent, which opens and shuts at pleasure. When open, besides emitting the steam, it admits both light and air. The cistern for filtered water holds 200 gallons, and supplies, by pipes and cocks, the copper tubs and sink.

The first copper is fixed so that the top of it is level with the bottom of the cistern, and the bottom of it is level with the top of the other copper, and the tops of the tubs and sink, all which it supplies with hot water. The tubs, coppers, and sink, are supplied with cold water from the cistern. Each of the tubs has a brass plug at bottom, to discharge the foul water. A nine-inch board runs along the front of the tubs and sink on the ground, to prevent the splashing of the water when discharged. Each tub is furnished with a small wooden strainer for soap.

The second copper is for boiling the linen, and has a copper cullender to hold the linen, which is drawn up by the jack and pulleys. The jack has a paul and ratchet wheel to keep the cullender suspended over the copper till the water is drained from the linen into the copper, which can then be turned out altogether into the rining-tub. By this contrivance, the usual mode of poking the linen out with a stick (which frequently damages it) is avoided. At the bottom of this copper is a large brass cock for discharging the fuds when they are done with.

Though the six tubs are supplied with both hot and cold water, there are only six cocks to the whole, one cock supplying two tubs, by means of a screw-joint in the nozzle, which turns at pleasure to either tub. There is also a screw-joint between the key and pipe in each cock, by which means it can at any time be repaired without the assistance of the plumber.

The filtering machine performs its operation by ascent. It has three cocks in one pipe: The uppermost is for regulating the quantity of water to be filtered, which can be varied at pleasure from 50 to 500 gallons in a day. The other is for cleansing the machine when saturated with filth, which is accomplished by only turning the cock, and will, in a few minutes, be as clean as it was at first, the mud, &c. being discharged at the third or middle cock, which also serves to draw unfiltered water when required. Under the cistern is a receptacle for coals, and under the filtering machine a place for pails and mops. Both cisterns have a surplus water-pipe to prevent running over, and in which are also plugs to discharge all the water when needful.

The table hangs to the wall, and may be put up and down at pleasure. It is for sorting and soaping the foul linen, &c.

The laundry adjoining the wash-house is 18 feet square, and 11 feet in height. It has two windows in front. The floor is level, of rubbed Yorkshire-stone, laid upon brick piers,

to keep it perfectly free from damp. It is furnished with one of Baker's large mangles; an ironing-board 12 feet by three feet, with four large drawers for the ironing-cloth, iron-holders, &c. with room for the clothes-baskets underneath; a stove or drying-closet, eight feet by six feet; a furnace for heating the closet and the irons, and a place for coals under the floor, close by the furnace. The closet contains four wooden horses, each with five rails or bars. Each horse runs in and out of the closet upon two small iron wheels, upon an iron rail-way. One horse holds six flurts, or a proportionable quantity of other linen, and the whole will dry off as much and as speedily as six women can wash in succession. It hardens the linen after being ironed, and is also useful for airing feather beds, &c. The linen, whilst drying, is kept free from smoke and dust, and there never can be any steam in the room.

The furnace for heating it is similar to those under coppers or in a hot-house, immediately over which, before it enters the flue to the closet, is an iron oven for heating the irons. The flue is continued round the bottom of the closet, and carried up the end of the building. The top of the horizontal part of the flue is of cast-iron plates; iron being a good, and brick a bad conductor of heat. A few inches above these iron plates, the iron rail-way before mentioned is laid, between which and the flue there is a flooring of wire work. This prevents any accident from the casual falling of linen upon the flues, but does not impede the ascent of warm air. Level with the rail-way, inside the closet, there is an opening 15 inches square, communicating with the external air. The ceiling of the closet is in the form of a hopper, terminating in a funnel of the same diameter (15 inches) as the external air-vent. Both these vents are furnished with a sliding door, which opens and shuts, as required, by pulley cords.

The principle upon which it acts is by heating it to a degree sufficient to excite a strong evaporation from the wet linen, and carrying off the moisture by means of the two vents. During the time of its acquiring this heat, both the vents, and also the horses, are kept closely shut, so that the closet is nearly air-tight. As soon as the proper degree of heat is obtained, both the vents are to be opened, when a strong current of air rushes in at the lower, carrying up all the vapour from the linen through the upper vent or funnel, when the drying will be very speedily completed. The linen is then removed, a fresh supply put in, and the operation repeated as before, beginning by closely shutting all up.

Besides the dispatch and economy attending this wash-house and laundry, the health and comfort of those employed in them are greatly promoted, by being entirely free from the pernicious effects of damp vapour, and in not being incommoded by any extra heat in hot weather.

Since this article was written, the gentleman above mentioned has made a considerable improvement in the wash-house. He has constructed an apparatus for performing the operation by *steam*. Although it is not yet (December 1811) quite completed, it is sufficiently so to have ascertained by experiment, that every species of *white* linen may be better cleansed this way than it is possible to do it by the hands, or any machine hitherto invented.—We say *white* linen, because the operation proves to be so powerful, that it discharges the colour from all dyed and printed articles that have been tried with it.

At the end of the wash-house a strong iron-boiler is fixed, three feet six inches long, one foot eight inches wide, and two feet nine inches deep, with fittings up the same as those for steam-engines, *viz.* a feeding-pipe with regulator, a

mercury gauge-tube, a three-inch steam-tube, two observation cocks, a safety valve, and a discharging pipe. From the steam-tube, a pipe of  $1\frac{1}{2}$  inch bore is continued the whole length of the building; and from this main steam-pipe, others of smaller dimensions, from  $\frac{3}{4}$  to  $\frac{1}{2}$  inch diameter, are laid on the different steaming vessels. These may be either of wood, tin, or copper; but the latter is certainly best, for the action of steam is so powerful, that it will soon render both wood and tin useless. They must be fitted with a loose grating inside, about two inches from the bottom; a cock at one end, to admit the steam; and another at the other end, quite at the bottom, to discharge the foul water. The process is as follows: Soap the linen where it is very dirty, and put it to soak; then place the linen upon the grating in the steam vessel; cover it up, and turn on the steam. The discharging cock must be occasionally opened, to draw off the condensed steam; and when it is found to come off perfectly clear, which it will do in half an hour, or less, the operation is finished, and the articles will come out perfectly clean, and most beautifully white.

By this simple and easy process, the drudgery of washing is entirely done away; and the saving in time, soap, and other expences, is greater than can well be conceived. The saving of water in many situations is a matter of consequence; but what is of still more importance, the linen will last double the time it otherwise would do: for as there is neither pressure nor friction, it cannot be injured in this process.

Washing by steam has been practised, but never before by this method. The way it has been done has been by steaming the linen *in the fuds*. Hence it is evident that the silt that is forced out of the linen is mixed with the fuds, and is again dispersed equally all through the linen; so that repeated changes of soap and water must be had recourse to, before the linen is made thoroughly clean. But by this new process, the linen being put into the steaming vessels, without any other liquor than it retains on being taken out of the soaking tubs, every particle of matter which is dislodged from it instantly subsides to the bottom of the vessel, and never can again come in contact with the linen. Our readers must excuse the prolixity of this article, on account of its great importance and usefulness in domestic economy to every family.

*Note.*—The boiler above described also heats an hot-house in an adjoining garden, besides boiling a copper, and thus does the work of six fires.

LAUNOY, JOHN DE. in *Biography*, was born at Val-de-He, a village of Lower Normandy, in 1603. He received the early part of his education at Constance, whence he was sent to the university of Paris, where he pursued his studies with great diligence for five or six years. In 1636 he was ordained priest, and soon after was admitted to the degree of doctor of divinity at the college of Navarre. For the sake of improvement he travelled to Rome, and became acquainted with the most eminent characters; but on his return to Paris, he applied with great intenseness to his studies, and composed a vast variety of works on subjects relating to history, criticism, and ecclesiastical discipline. At his own house he formed a kind of literary school, for the discussion of topics that tended to the improvement of the mind. He was an able defender of the rights of the Gallican church, in opposition to the pretensions of Rome. He attacked several false traditions with great intrepidity; and he contended so forcibly for expunging the names of several false saints from the calendar, that he was called the banisher of saints. It was said of him, that "he was a terrible critic, formidable both to heaven and earth; that he

had expelled a greater number of saints from paradise than ten popes have canonized. He suspected the whole martyrology; and he examined all the saints one after another, in the same manner as they do the nobility in France." By the freedom which he exercised in his writings, he provoked against him an host of enemies; and he was obliged, at the intimation of the king, to discontinue his assemblies, which were held at his own apartments. He met with an excellent friend in the abbé d'Élreves, who presented him with a very valuable preferment in the church, which he soon resigned, choosing to live contented on a small income rather than endure the cares of business. He said that it was much more difficult for a Christian to make a right use of riches, than to live without them. He died in his 75th year, in 1678. His works are very numerous, and have been collected and published in ten volumes, folio. Of one of his pieces, viz. "De Auctoritate negantis Argumenti," Bayle says, had he published nothing else, he would have established his fame as a benefactor to the republic of letters, by a thousand fine hints which it contains for distinguishing truth from falsehood in historical matters. He was a person of great simplicity, a good friend, disinterested, and laborious; an enemy to vice, void of ambition, charitable and beneficent, and ever observing the same tenor of life. Bayle. Moreri.

LAUNY, or LAUX, in *Geography*, a town of Bohemia, in the circle of Saatz, on the Egra, on the road from Leipzig to Prague; 9 miles E.N.E. of Saatz. N. lat. 50° 20'. E. long. 13° 54'.

LAVOISIER, ANTHONY LAWRENCE, in *Biography*, a distinguished chemical philosopher, was born at Paris, on the 13th of August 1743. His father, who was a man of opulence, spared no expence in bestowing upon him the advantages of a liberal education; and he displayed very early proofs of the extent and success of his studies, especially in the circle of the physical sciences. In the year 1764, the French government proposed a prize question, relative to the best method of lighting the streets of a large city. Lavoisier presented a dissertation on the subject, which he discussed upon the most enlarged and philosophical views. This was not only highly approved, and printed at the expence of the Academy of Sciences, but obtained for him the present of a gold medal from the king, which was delivered to him by the president of the Academy, at a public sitting, in April 1766. Two years afterwards, he was admitted a member of that learned body, of which he was constantly one of the most active and useful associates. About the same time, he was occupied in experimental researches on a variety of subjects; such as the analysis of the gypsum found in the neighbourhood of Paris; the crystallization of salt; the properties of water; and in exploring the phenomena of thunder, and of the aurora borealis; and he distinguished himself by several dissertations on these and other topics, practical and speculative, which appeared in different periodical works. In the Memoirs of the Academy for 1770 were published his observations on the nature of water, and on the experiments which had been supposed to prove the possibility of its conversion into earth. He proved, by a careful repetition of these experiments, that the earthy deposit, left after repeated distillations of water, proceeded solely from an abrasion of the vessels employed. Lavoisier performed several journeys into various parts of France, in company with M. Guettard; in the course of which he collected a store of materials for a lithological and mineralogical history of that kingdom, which he ingeniously arranged in the form of a chart. These materials were the basis of a great work on the revolutions of the globe, and on the formation of the strata of the earth: two interesting sketches of which were printed

printed in the Memoirs of the Academy for the years 1772 and 1787.

In fact, M. Lavoisier devoted his whole time and fortune to the cultivation of the sciences, the boundaries of which he seemed, by such an union of zeal, talent, and wealth, destined to extend. About this period, a new mine of experimental research, which promised the most curious and interesting results, had been opened out by the genius of Dr. Black, and already pursued with much sagacity and industry by Dr. Priestley.—We allude to the discovery of the properties of certain acrimonious substances, gases, or (as they have been called) factitious airs, which had hitherto escaped the attention of chemical inquirers. M. Lavoisier, struck with the beauty and importance of these discoveries, entered into the same field of research with all the scientific ardour by which he was characterized: and here the advantage of his ample wealth was manifest; for he conducted his experiments upon a large scale, with costly instruments of the most improved construction. The result of this course of experimental inquiry he gave to the world in 1774, in his “Opuscules Chymiques,” which contained not only a clear and elegant view of all that had hitherto been done, in regard to gaseous or acrimonious fluids, but also several original experiments, remarkable for their ingenuity and accuracy.

The existence of a gaseous body, in a fixed or solid state, in the mild alkalies and alkaline earths, which, when expelled from these substances, assumed an aerial form, and left them in a caustic state, as well as its production during the combustion of fuel, had been demonstrated by Dr. Black; and Bergman had shewn that this air possessed acid properties. Dr. Priestley had also submitted it to various experiments in the year 1767; but no progress had been made in ascertaining the real constituent parts of this acid gas, or fixable air. The honour of this discovery was left for Lavoisier; who, in 1772, by exposing a piece of charcoal, inclosed in a glass vessel, to the action of a lens, discovered that part of the charcoal was consumed, that a diminution of air had taken place in the receiver, and that the residue possessed the properties of the fixable air:—whence he concluded that charcoal was one of the constituent parts of this gas. The combustible nature of the diamond having been already proved by Macquer, d’Arcet, and others, Lavoisier was induced to submit this substance to the same treatment as the charcoal in the former experiment: and he found that precisely the same results took place: whence he inferred, that there existed a great analogy between charcoal and diamond. Both these conclusions have been amply confirmed by subsequent experiments: they were in every respect important; and seen, together with the facts previously known, of the production of acids by the combustion of sulphur and phosphorus, to have given the first hint to Lavoisier of his subsequent general theory of the formation of acids.

Lavoisier now turned his experimental researches to the subject of the calcination (as it was then termed, from its apparent similarity to the process of making lime) of metals. It had already been shewn by Rey and Homberg, that metals acquire an augmentation of weight during calcination. This additional weight was attributed by the latter to the fixation of heat and light; but was supposed by the former to proceed from the fixation of a part of the air. M. Lavoisier published the result of his investigation of this curious subject in 1774, in a memoir on the calcination of tin in close vessels, in which he demonstrated the following very important facts. He shewed, 1, that a given quantity of air was requisite for the calcination of a given quantity of tin; 2, that a part of the air is absorbed during this pro-

cess, by which not only the bulk, but the weight of the air is diminished; 3, that the weight of the tin is increased during the same process; and, 4, that the weight acquired by the tin is exactly equal to that which is lost by the air.

Thus by a few simple, accurate, and well-chosen experiments, Lavoisier had apparently arrived at the legitimate inference, that during the process of the formation of acids, whether with carbonaceous matter, sulphur, or phosphorus, and also during that of the calcination of metals, an absorption and fixation of air take place, and thus he gained a glimpse of principles, in the view of which his singular sagacity in devising experiments, and his accuracy in executing them, would in all probability have alone conducted him to those brilliant results, to which the active genius of Dr. Priestley so materially contributed. The synthetic proof, only of this union of air with the base had been as yet ascertained: but Dr. Priestley first furnished the analytic proof, by dissolving the combination; a discovery which at once advanced the nascent theory of Lavoisier, and, in his hands, became the source of more than one important conclusion. In August 1774, Dr. Priestley discovered, that by heating certain metallic calces, especially the calcined mercury, (the precipitate *per se*, as it was then called,) a quantity of air was separated, while the mercury resumed its metallic form; and this air, which he found was much purer than that of the atmosphere, he called, from the theory of the time, *dephlogisticated air*. The succeeding winter he spent at Paris, and communicated to Lavoisier, and the other philosophers there, his recent discovery: and the importance of this intelligence to the views of Lavoisier was manifest in a memoir published by him in the following year, 1775, on the nature of the principle which combines with metals during their calcination. In this paper he shewed, in conformity with the experiments of Dr. Priestley, that the mercurial precipitate *per se*, by being heated in a retort, gives out a highly respirable air, (since called *oxygen*), and is itself reduced to the metallic state; that combustible bodies burn in this air with increased brilliancy; and that the same mercurial calx, if heated with charcoal, gives out not the pure air, but fixed air:—whence he concluded that fixed air is composed of charcoal and the pure air. It has, therefore, since been called *carbonic acid*.

A second very important consequence of Dr. Priestley’s discovery of the pure or vital air, was the analysis of the air of the atmosphere: which was accomplished by Lavoisier in the following manner. He included some mercury in a close vessel, together with a known quantity of atmospheric air, and kept it for some days in a boiling state: by degrees a small quantity of the red calx was formed upon the surface of the metal; and when this ceased to be produced, the contents of the vessel were examined. The air was found to be diminished both in bulk and weight, and to have been rendered altogether incapable of supporting combustion or animal life: part of the mercury was found converted into the red calx, or precipitate *per se*; and, which was extremely satisfactory, the united weight of the mercury and the precipitate exceeded the weight of the original mercury, by precisely the same amount as the air had lost. To complete the demonstration, the precipitate was then heated, according to Dr. Priestley’s first experiment, and decomposed into fluid mercury and an air, which had all the properties of vital air; and this air, when mixed with the unrespirable residue of the original air of the receiver, composed an elastic fluid possessing the same properties as atmospheric air. The vital air was afterwards made the subject of various experiments in respect to the calcination of metals, to the combustion and conversion of sulphur and phosphorus into acids,

acids, &c. in which processes it was found to be the chief agent. Hence it was named by Lavoisier *oxygen* (or generator of acids), and the unrespirable residue of the atmosphere was called *azot*, (*i. e.* incapable of supporting life.)

The new theory thus acquired farther support and consistency: oxygen appeared to be one of the most active and important agents of chemistry and of nature; combustion, acidification, and calcination, (or, as it was now called, *oxydation*, the calces being also termed *oxyds*, *i. e.* something approaching to, or resembling acids,) were proved to be processes strikingly analogous to each other; all according in these points, that they produced a decomposition of the atmospheric air, and a fixation of the oxygenous portion in the substance acidified or calcined.

Time alone seemed now requisite to establish these doctrines, by exemplifying them in other departments of chemical research. In the year 1777, six memoirs were communicated to the Academy of Sciences by Lavoisier, in which his former experiments were confirmed, and new advances were made to a considerable extent. Our countrymen, Black and Crawford, in their researches respecting latent heat, and the different capacities of bodies under different circumstances, had laid a solid foundation, on which the doctrines of combustion, resulting from the foregoing experiments, might be perfected, and the cause of the light and heat connected with it might be explained. The first mentioned philosopher, Dr. Black, had shewn, that a solid, when it is made to assume a liquid form, and a liquid, when it assumes the form of vapour, absorbs or combines with, and renders latent, a large portion of heat, which is again parted with, becomes free and cognizable by the sense of feeling, and by the thermometer, when the vapour is again condensed into a liquid, and the liquid becomes solid. In like manner, it was now said by Lavoisier, during the process of combustion, the oxygen, which was previously in a gaseous state, is suddenly combined with the substance burnt into a liquid or solid. Hence all the latent heat, which was essential to its gaseous state, being instantaneously liberated in large quantity, produces flame, which is nothing more than very condensed free heat. About the same time, the analogy of the operation and necessity of oxygen in the function of respiration, with the preceding hypothesis of combustion, was pointed out by Lavoisier. In the process of respiration, it was found that, although atmospheric air is inhaled, carbonic acid and azot are expired. This animal operation, said Lavoisier, is a species of slow combustion: the oxygen of the air unites with the superfluous carbon of the venous blood, and produces carbonic acid, while the latent or combined *caloric* (the matter of heat) is set free, and thus supplies the animal heat. Ingenious and beautiful, however, as this extension of the analogy appeared, the subject of animal temperature is still under many obscurities and difficulties.

The phenomena of chemistry, however, were now explainable upon principles more simple, consistent, and satisfactory than by the aid of any former theory; and the Lavoisierian doctrines were every where gaining ground. But there yet remained a formidable objection to them, which was derived from a circumstance attending the solution of metals in acids; to wit, the production of a considerable quantity of inflammable air. If sulphuric acid (formerly called vitriolic acid, or oil of vitriol) consists only of sulphur and oxygen, it was said, and bar iron is nothing more than this metal in a simple state, how does it happen, that when these two substances, with a little water, come in contact, they should produce a large quantity of inflammable air during their reaction? This objection was unanswerable, and appeared to be fatal

to the whole theory; but it was most opportunely converted into an argument in its favour, by the great discovery of the decomposition of water, made by Mr. Cavendish, who resolved that element, as it was formerly esteemed, into oxygen and inflammable air. The latter has since, therefore, been called *hydrogen*, or generator of water. This experiment was repeated with full success by Lavoisier and his associates in 1783; and the discovery was further established by a successful experiment of the same chemists, carried on upon a grand scale, in which, by combining the oxygen with hydrogen, they produced water, and thus adding synthesis to analysis, brought the fact to demonstration.

This new view of chemical phenomena, together with the immense accession of new compounds and substances, which the labours of modern experimentalists had brought to light, appeared to demand a correspondent alteration in the nomenclature. Accordingly, a committee of some of the ablest of the French chemists, of whom Lavoisier was the most conspicuous, undertook the arduous task, and produced a regular system of nomenclature, derived from the Greek language, which, although far from being faultless, and notwithstanding much opposition with which it was at first treated, has become the universal language of chemical science, and has been adopted even in pharmacy and medicine. His work, entitled "Elemens de Chymie," which was published in 1789, was a model of scientific composition.

We have hitherto viewed M. Lavoisier principally as a chemical philosopher, in which character he has founded his great claims to the respect and admiration of posterity. But the other arts and sciences are indebted to him for considerable services which he rendered them, both in a public and private capacity. In France, more than in any other country, men of science have been consulted in matters of public concern; and the reputation of Lavoisier caused him to be applied to, in 1776, to superintend the manufacture of gunpowder, by the enlightened minister Thurgot. By the application of his chemical knowledge to this manufacture, he was enabled to increase the explosive force of the powder by one fourth; and while he suppressed the troublesome regulations for the collection of its materials from private houses, previously adopted, he quintupled the produce. The Academy of Sciences received many services from his hands. In addition to the communication of forty papers, relative to many of the most important subjects of philosophical chemistry, which were printed in the twenty volumes of *Memoirs*, from 1772 to 1793, he most actively promoted all its useful plans and researches, being a member of its board of consultation, and, when appointed to the office of treasurer, he introduced order into its accounts, and economy into its expenditure. When the new system of measures was proposed, he contributed some new and accurate experiments on the expansion of metals. The national convention consulted him with advantage concerning the best method of manufacturing assignats, and of securing them against forgery. Agriculture early engaged his attention, and he allotted a considerable tract of land on his estate in the Vendome, for the purpose of experimental farming. The committee of the constituent assembly of 1791, appointed to form an improved system of taxation, claimed the assistance of his extensive knowledge; and he drew up, for their information, an extract of a large work on the different productions of the country and their consumption, for which he had been long collecting materials. This was printed by order of the assembly, under the title of "Richesses Territoriales de la France," and was esteemed the most valuable memoir on the subject. In the same year, he was appointed one of the commissioners of the national treasury; and he introduced

into that department such order and regularity, that the proportion between the income and the expenditure, in all the branches of government, could be seen at a single view every evening. This spirit of systematic and lucid arrangement was, indeed, the quality by which he was peculiarly distinguished, and its happy influence appeared in every subject which occupied his attention.

The private life of this distinguished person was equally estimable with his public and philosophical character. He was extremely liberal in his patronage of the arts, and encouraged young men of talents in the pursuit of science. His house became a vast laboratory, where philosophical experiments were incessantly carrying on, and where he held conversazioni twice a week, at which all the votaries of learning and science, foreigners as well as Frenchmen, assembled. In his manners M. Lavoisier was mild, affable, and obliging; a faithful friend and husband, a kind relation, and charitable to the poor upon his estates; in a word equally claiming esteem for his moral qualities, as for those of his understanding.

The time was arrived, however, when distinction even by his talents and worth was so far from securing public respect, amid the tumults of the revolution, that it became a source of danger, and, when joined with wealth, was almost certainly fatal. All those especially, who had held any situation under the old administration, particularly in the financial departments, were sacrificed during the murderous reign of Robespierre, to the popular odium. Lavoisier was seized and thrown into prison, upon some charges fabricated against himself and twenty-seven other farmers-general. During his confinement he foresaw that he should be stripped of all his property; but consoled himself with the expectation that he would be able to maintain himself by the practice of pharmacy. But a more severe fate awaited him: he was capitally condemned, and dragged to the guillotine, on the 8th of May, 1794.

The name of Lavoisier will always be ranked among the most illustrious chemists of the present age, when it is considered what an extensive and beneficial influence his labours have had over the whole science. It has been said, indeed, that if he be estimated on the score of his actual discoveries, not only Scheele and Priestley, and Cavendish, but many more, will stand before him. But he possessed in a high degree that rare talent of discernment, by which he detected analogies, which others overlooked, even in their own discoveries, and a sagacity in devising and an accuracy in completing his experiments, for the purpose of elucidating every suggestion which he thus acquired, such as few philosophers have possessed. No one who did so much, probably ever made so few unsuccessful or random experiments. It was the singular perspicuity, simplicity and order to which he reduced the phenomena of chemistry, that claimed for his theory the general reception which it met with, and occasioned the abandonment of those doctrines which prejudice and habit conspired to support. Subsequent discoveries, however, and more especially those numerous facts which the genius of Mr. Davy has lately brought to light, through the medium of that most powerful agent of decomposition, galvanism, have rendered several modifications of the Lavoisierian theory necessary, and bid fair to produce a more general revolution in the language and doctrines of chemistry.

M. Lavoisier married, in 1771, the daughter of a farmer-general, a lady of pleasing manners and considerable talents, who partook of her husband's zeal for philosophical inquiry, and cultivated chemistry with much success. She engraved with her own hand the copper plates for his last work. Mad. Lavoisier has since given her hand to another eminent philo-

sopher, count Rumford. Gen. Biog. Hutchinso'n's Biog. Med.

**LAVONIA**, in *Geography*, a town of Naples, in Calabria Citra; 8 miles W.S.W. of Rossano.—Also, a town of Calabria Ultra; 14 miles W. of Squillace.

**LAVORA**, or **TERRA DI LAVORA**, a fertile and delightful province of Naples, diversified with hills and plains, lying between 40° 36' and 41° 45' N. lat.; and anciently Terra Laboria, Campana, and Campus Laboricus, and in the middle ages the Castellany of Capua. It received its present name in 1001 from Richard II., prince of Capua, on account of the fitness of the soil for every kind of cultivation. This province is populous, and abounds in corn, wine, oil, and other productions of Italy. It is bounded on the N.W. by Campagna di Roma, on the N. and E. by Abruzzo Citra and Contado di Molise, on the S.E. and S. by Principato Ultra and Principato Citra, and on the W. by the Mediterranean; being 90 miles from N.W. to S.E. and 30—45 in breadth; and in 1779 it contained 1,210,689 inhabitants. It is watered by the rivers Carigliano and Volturno; the former, which is a placid stream, rises in Abruzzo Ultra, and falls into the sea below Trajeto; the latter descends from the Apennines, passes by Capua, and loses itself in the gulf of Gaeta. The capital of this province is Naples.

**LAUPEN**, a town of Switzerland, in the canton of Berne, and chief place of a bailiwick: it is situated at the conflux of the Sannen and Senfe; 5 miles S.W. of Berne. It was once imperial.

**LAUQUEN**, called *Villarica* by the Spaniards, a lake of Chili, about 72 miles in circuit, with a beautiful conic hill in the centre. From this hill springs the river Tolten, which joins the Pacific ocean.

**LAUR**, a town of Persia, in Chulistan; 50 miles E. of Tostar.

**LAURA**, a town of Russia, in the government of Moscow; 36 miles N.E. of Moscow.

**LAURA**, a town of Hindoostan, in the circar of Nagore; 20 miles W. of Catchwana,

**LAURA**, *Λαυρα*, primarily signifying *village, street, or hamlet*, a name given to the residence of the ancient monks. Authors cannot agree about the difference between a laura and a monastery: some pretend, that a laura was a monastery, wherein there lived at least a thousand monks; but this is nowise credible. The more natural opinion is, that the ancient monasteries were the same with the modern, consisting of large buildings divided into halls, chapels, and cells, possessed by the monks, each of whom had his apartment; but the lauræ were a kind of villages, whereof each house was inhabited by one or two monks at the most; so that the houses of the Chartreux seem, in some measure, to represent the ancient lauræ, and those of the other monks proper monasteries. The term laura was only understood of the religious places in Egypt, and the East, where their houses stood apart from each other, and were not joined by any common cloister, the monks that inhabited them only meeting in public once a week.

**LAURADIO**, in *Geography*, a town of Portugal, in the province of Estramadura, on the S. side of the Tagus; 6 miles S.S.E. of Lisbon.

**LAURAGAIS**, the name, before the revolution, of a small county of France, in Upper Languedoc, of which Castelnaudary was the capital.

**LAURANA**, a sea-port of Istria, with a small harbour, in the gulf of Quarnero; 8 miles S. of Castua. N. lat. 45° 28'. E. long. 14° 17'.

**LAURE**,

LAURE, a town of Portugal, in the province of Alentejo; 30 miles W.N.W. of Evora.

LAUREAT, POET, is a well known office in the king's household. Sir John Hawkins observes, that there are no records which ascertain the origin of the institution of the office in this kingdom, though there are many that recognize it. It appears that as early as the reign of Henry III. there was a court poet, named Henry de Avranches, who is supposed to have had an appointment of a hundred shillings a year, by way of salary or stipend. In 1341 Petrarch was crowned with laurel in the Capitol by the senate of Rome; afterwards Frederic III. emperor of Germany, gave the laurel to Conrad Coltes; and ever since the counts palatine of the empire have claimed the privilege of solemnly investing poets with the bays. Chaucer, who was contemporary with Petrarch, and acquainted with him, when abroad, assumed the title of poet-laureat on his return to England; and in the 12th year of Richard II. obtained a grant of an annual allowance of wine. We read of persons under the same title in the reigns of Edward IV. Henry VII. and VIII. and of James I. who, in 1615, granted to his laureat an annual pension of 100 marks. In the year 1630, this pension was augmented, by letters patent of Charles I. to 100*l.* per annum, with an additional grant of one terle of Canary Spanish wine, to be taken out of the king's store of wines yearly. *Hawkin's Hist. of Music, vol. iv. p. 13.*

LAUREATION, a term in the Scottish universities, used for the act of taking up the degree of a master of arts, to which the students are admitted after four years' study in the universities.

LAUREL, in *Botany and Gardening*. See *Laurus* and *Prunus*.

LAUREL, *Common or Cherry, Prunus laurocerasus*, in the *Materia Medica*, is a native of the Levant, and has been long cultivated in Britain. The leaves have a bitter styptic taste, accompanied with a flavour resembling that of bitter almonds. The flowers also have a similar flavour. The powdered leaves, applied to the nostrils, excite sneezing, but less powerfully than tobacco. The kernel-like flavour of the leaves has caused them to be used for culinary purposes, especially in custards, puddings, blanc-mange, &c. and as the proportion to the quantity of milk is inconsiderable, this has been done without any noxious effect. However, as the poisonous quality of this laurel is now indubitably proved, the public should be cautioned against its internal use. The first and principal proofs of the deleterious effects of this vegetable upon mankind were communicated to the Royal Society by Dr. Madden of Dublin, in a "letter giving an account of two women being poisoned by the simple distilled water of laurel-leaves, and of several experiments upon dogs, by which it appears that this laurel is one of the most dangerous poisons hitherto known." He mentions also the case of a gentleman, who by mistake drank a quantity of this laurel water, and died in a few minutes, complaining of a violent disorder in his stomach. (*See Phil. Trans. N<sup>o</sup> 418. 426. vol. xxxvii.*) The case of Sir Theodosius Boughton is more recent. His death in 1780 was ascribed by an English jury to this poison. In this case the active principle of the laurocerasus was concentrated by repeated distillations, and given to the quantity of an ounce. It has been found by the experiments of Madden, Mortimer, Nicholl, Langrish, Vater, Fontana, and others, that to brute animals this poison is almost instantaneously mortal. These experiments also shew, that the laurel-water is destructive to animal life, not only when taken into the stomach, but also on being injected into the inter-

ines, or applied externally to different organs of the body. The most volatile is the most active part of the laurocerasus; and from its sensible qualities we may be led to judge, that an analogous principle seems to pervade many other vegetable substances, especially the kernels of drupaceous fruits; and in various species of the Amygdalus, this lapid principle extends to the flowers and leaves. It is observable, that it is much less powerful in its action upon human subjects than upon dogs, rabbits, pigeons, and reptiles. To poison man, the essential oil of the laurocerasus must be separated by distillation, as in the spirituous or common laurel water; and unless this is strongly imbued with the oil, or given in a large dose, it proves innocent. Dr. Cullen remarks, that the sedative power of the laurocerasus acts upon the nervous system in a different manner from opium and other narcotic substances, whose primary action is upon the animal functions; for the laurocerasus does not occasion sleep, nor does it produce local inflammation, but seems to act directly upon the vital powers. "Although this vegetable seems to have occupied the notice of Stoerck, its medicinal use has its advocates. From Linnaeus we learn, that in Switzerland it is commonly and successfully used in pulmonary complaints. Langrish mentions its efficacy in agues; and as Bergius found bitter almonds to have this effect, we may from analogy conclude, that this power of the laurocerasus is well established. Baylies found that it possessed a remarkable power of diluting the blood, and from experience, recommended it in all cases of disease supposed to proceed from too dense a state of that fluid; adjucing particular instances of its efficacy in rheumatism, asthma, and in scirrhus affections. Nor does this author seem to have been much afraid of the deleterious quality of the laurocerasus, as he orders a pound of its leaves to be macerated in a pint of water, of which he gives from 30 to 40 drops three or four times a day." *Woodville's Med. Bot.*

LAUREL, *Alexandrian, in Botany*. See *Ruscus*.

LAUREL, *Dwarf, of America*. See *Kalmia*.

LAUREL, *Sea-fule*. See *Phyllanthus*.

LAUREL, *Spruce, or Spurge*. See *Daphne*.

LAUREL Mountains, in *Geography*, a range of mountains W. of the Alleghany ridge, and part of the Alleghany mountains; extending from Pennsylvania to North Carolina, and giving rise to several branches of the Ohio river. The Great Kanlawha breaks through the Laurel ridge in its way to the Ohio. N. lat. 38° 30'. W. long. 81° 10'. About lat. 36°, in a spur of this mountain, is a spring of water 50 feet deep, very cold, and, as it is said, blue as indigo. The lands, within a small distance of the Laurel mountains, through which the Youghiogini river runs, are in many places broken and stony, but rich and well timbered; and in some places, and particularly on Laurel creek, they are rocky and mountainous. From the Laurel mountain to Monongalela, the lands for the first seven miles are good, level, and fit for farming, interspersed with fine meadows: the timber, white-oak, chestnut, hickory, &c. Morfe.

LAUREL RIVER, a river of Kentucky, which runs into the Cumberland. N. lat. 36° 34'. W. long. 83° 50'.

LAURELS, pieces of gold coined in the year 1610, with the king's head laureated, which gave them the name of laurels; the twenty-shilling pieces of which were marked with XX, the ten shillings X, and the five-shilling pieces with V.

LAUREMBERG, Peter, in *Geography*, a learned physician, was born at Rotterdam, where his father was professor of medicine and mathematics. Peter took the degree of doctor in the university of his native place, and afterwards travelled.

travelled into France, and settled for some time at Montauban, where he taught philosophy in 1611. In 1614, however, he was at Hamburg, and was professor of natural philosophy there until 1620; when he returned to Rollock, and was appointed professor of poetry in 1624. He died in this city on the 13th of May, 1639, at the age of 54. He left several works; those on anatomy, however, were esteemed by Riolan as of very indifferent worth. They are, "Disputationes Physicæ," Rollock, 1616. "Hæcogæ Anatomica Græcæ Interpretatio," Hamburg, 1616. "Proſceſſus Anatomica," *ibid.* 1619. "Laurus Delphica, seu, Conſilium quo deſcribitur Methodus perfacilis ad Medicinam," Leyden, 1621. "In Synopſin Aphoriſmorum Chymiatricorum Angeli Salæ, Vicentini, Notæ et Animadverſiones," Rollock, 1624. "Porticus Eſculapii, ſeu, generalis Artis Medicæ Conſtitutio," *ibid.* 1630. "Apparatus Plantarius primus, &c.," Francfort, 1632. "Palcomple nova, id eſt, delineatio Pulchritudinis," Leiſpic, 1634. "Anatomia corporis humani, ſive Collegium Anatomicum duodecim diſputationibus comprehenſum," Roſt. 1636.

William Lauremberg, the father of the preceding, who died in 1612, left an "Eſſay on the malignant, pectehial Fever," Rollock, 1605; and the following poſthumous works: "De Curatione Calculi," Leyden, 1610. "Botanotheca, ſive Modus conficiendi Herbarium vivum," 1626; and "Hiſtoria Deſcriptionis Aelitis, ſive Lapidis Aquila," 1627. His younger ſon, John Lauremberg, likewiſe was a phyſician, and author of ſeveral works, on the antiquities of Greece, algebra, and arithmetic, &c. Eloy. Dict. Hiſt. de la Méd.

LAUREMBERGIA, in *Botany*, ſo named by Bergius in honour of Peter Lauremberg, formerly an excellent gardener, who publiſhed a work on horticulture at Francfort in 1632, which is ſaid to have led the way to the modern improvements in that art. Berg. Cap. 350. t. 5. f. 10. See SERPICULA, to which the ſynonym of Bergius undoubtedly belongs, though cited with hesitation in Schreb. Gen. 628. Lamarck's figure of *Serpicula*, t. 758, is in fact a copy of that of Bergius.

LAURENCE, *Canons of St.*, an order of regular canons, ſo called from the monaſtery of St. Laurence d'Oulx, in Dauphiné.

This congregation is ſaid to have been founded by St. Benediſt. It was deſtroyed by the Vandals, and continued uninhabited till the middle of the 11th century. In 1057, Odo, count of Savoy, gave it to one Gerard, and his canons. This donation was confirmed in 1065, by Cunibert, biſhop of Turin, who added to it above forty other churches; by which means a very conſiderable congregation was formed, to whom the ſucceeding popes, and counts of Savoy, granted a great many privileges.

It had thirty priories; the chief, who is the prior of the congregation, bears the title of provost, and exerciſes a ſpiritual juriſdiction throughout his provostſhip.

LAURENCE, *Bay of St.*, in *Geography*, a bay on the E. coaſt of Ruſſia, at the entrance of Beering's ſtraits. N. lat. 63° 47'. E. long. 188° 15'.

LAURENCE *Creek*, a river of Kentucky, which runs into the Ohio, N. lat. 38° 30'. W. long. 83° 36'.

LAURENCE *Iſland*, a ſmall iſland in the gulf of Florida, near the coaſt of Eaſt Florida. N. lat. 25° 36'. W. long. 80° 22'.

LAURENCE *Iſland*, an iſland in the Pacific ocean, on the coaſt of Ruſſia, near Tſchukotſkoi Noſs; about three leagues in circuit. N. lat. 63° 47'. E. long. 188° 15'.

LAURENCE, *Gulf of St.*, a part of the North Atlantic ocean, ſituated between the iſland of Newfoundland, Labra-

dor, Canada, Nova Scotia, and the iſland of Cape Breton; 350 miles in length, and 150 in breadth. This is the eſtuary of the river of the ſame name, and is generally frozen from December to April. This noble gulf is cloſed by the iſland of Newfoundland, and by numerous ſand-banks, particularly by that which is called the Great Bank. N. lat. 47° 51'. W. long. 57° to 65°.

LAURENCE, *Harbour of St.*, a bay on the S. coaſt of Newfoundland, ſituated N.W. of the entrance into Placentia bay.

LAURENCE *Key*, a ſmall iſland in the bay of Honduras, near the coaſt of Mexico. N. lat. 16°. W. long. 89° 48'.

LAURENCE *Kirk*, a town of Scotland, in the county of Kincardine, in which have been lately eſtabliſhed manufactures of lawns, cambric, &c. In 1799 it was created into a burgh of barony, with the privilege of a market. The population in 1801 was 1215; 7 miles W. of Berwie.

LAURENCE, or *Lawrence, River of St.*, the laſt, or at leaſt the ſecond, river in North America, being not leſs than 90 miles wide at its mouth, and navigable for ſhips of the line as far as Quebec, a diſtance of 400 miles from the ſea. Near Quebec it is five miles wide; at Montreal, 560 miles from its mouth, from two to four miles broad. To this place it is navigable with perfect ſafety for ſhips drawing fourteen feet water. During the whole of its courſe to Kingſton on lake Ontario, 743 miles from its mouth, it is navigable for batteaux of two tons burden, except merely at the rapids above Montreal, at the Fall of the Thicket, and at the Long Fall, where it is neceſſary to lighten the batteaux, if heavily laden. Mr. Weld ſuggeſts, that at each of theſe places it is poſſible to conſtruct canals, ſo as to prevent the trouble of unloading any part of the cargoes of the batteaux; and that, at a future day, when the country becomes rich, ſuch canals will, without doubt, be made. The force of this river is not preciſely aſcertained; but the name is generally appropriated to the ſtream that iſſues from lake Ontario. From Ontario to Montreal it has the name of Iroquois, and afterwards it aſſumes the name of St. Laurence. This river cannot, conformably to geographical uſage, be traced beyond lake Ontario, to lake Superior; much leſs, with Mr. Weld, to lake Winipic, which, according to the beſt maps, has no communication with the ſea of Canada, or the connected lakes Superior, Michigan, and Huron. The length of the St. Laurence may be reckoned about 700 Britiſh miles, its chief characteristic being its breadth. Mr. Weld has made ſeveral obſervations on the importance of this river to the commerce of North America. The time required to aſcend this river, from Montreal to Kingſton, is commonly found to be ſeven days, but with a ſtrong and favourable wind the voyage may be performed in leſs time, and with an adverſe wind it will of courſe require longer time. The paſſage downwards is performed in four or five days, according to the wind. The current is ſo ſtrong, that a contrary wind ſeldom lengthens the paſſage in this direction more than a day. The channel of this river, inſtead of having been impaired by time, like thoſe of many others, and that of the Miſſiſſippi in particular, is found to be conſiderably better now than when it was firſt diſcovered; and there is reaſon to imagine that it will improve ſtill more in proceſs of time, as the clear water from lake Ontario comes down with ſuch impetuouſity during the floods in the ſpring of the year, as frequently to remove banks of ground and of looſe ſtones in the river, and thus to deepen its bed. To this purpoſe, it is obſerved, that the channel on the N. ſide of the iſland of Orleans, immediately below Quebec, which, in the year 1720, was not deep enough to admit a ſhallop

Mallof of small size, except at the time of high tides, is at present of sufficient depth for the largest vessels, and is the channel most generally used. This river, in its course, forms a great variety of bays, harbours, and islands, which are not only fertile and pleasant, but favourable for the purposes of commerce. It appears by a comparison of the St. Laurence with other rivers, connecting the lakes with the Atlantic ocean, that this river opens a shorter passage than any of the others, and that the portages are shorter than in any of the other routes; they are also fewer, and goods may be transported in the same boats the whole way from Montreal to the lakes. Besides, the St. Laurence will, on another account, be found a more commodious channel than any other for the carrying on of trade between the ocean and the lakes. Being constantly supplied from that immense reservoir of water, lake Ontario, it is never so low, even in the driest season, as not to be sufficiently deep to float laden bateaux.

The scenery along various parts of this river is very fine, as it winds for hundreds of miles through a rich country, diversified with rising grounds, woodlands, and cultivated plains. The attention, in going down the river, is particularly attracted by the beautiful disposition of the towns and villages on its banks. All the houses have a neat appearance at a distance; and in each village, however small, there is a church: the churches are kept in good repair, and most of them are covered, according to the custom of the country, with tin, which, from the manner in which it is put on, never becomes rusty.

LAURENS, ANDREW DU, or LAURENTIUS, in *Biography*, a French physician, was born at Arles. He was a disciple of Lewis Duret, at Paris; but after having taken his degree of doctor of medicine, he settled in a provincial town. He was induced, however, to accompany a lady of quality to court, and through her interest was appointed chancellor of the university of Montpellier, physician to the queen, and ultimately (in 1606) first physician to the king, Henry IV. He died in 1609. He left several works, the principal of which were upon anatomical subjects, and were more remarkable for elegance of style, than correctness in the detail of facts. His "*Historia Humani Corporis et singularum ejus partium anatomica*," folio, 1600, was often reprinted, and translated into French by Heliot, in 1741. The figures of this work are chiefly copied from Vesalius. He published also "*Discours de la Vue, des Maladies melancholiques, des Catarrhes, et de la Vieillesse*," 1596, which was translated both into Latin and English. Gen. Biog. Hutchinsof Biog. Med.

LAURENS, in *Geography*, a district of South Carolina, lying between Enoree and Saluda rivers; about 31 miles long and 22 broad, containing 12,809 inhabitants, of whom 1919 are slaves.

LAURENS Court-house, a place in the above county, 20 miles from Bush river, 32 from Newbury, and 40 from Greenville; in which is a post-office.

LAURENS, *St.*, a small island in the Indian sea. S. lat. 9° 35'. E. long. 52°.

LAURENT, *St.*, a town of Hispaniola, on the Ozema; seven miles N. of St. Domingo.—Also, a town of France, in the department of the Vendée; seven miles S.E. of Mortagne.—Also, a town of France, in the department of the Jura; 12 miles N. of St. Claude.—Also, a town of France, in the department of the Lower Seine; seven miles N. of Rouen.—Also, a town of France, in the department of the Aude; four miles E. of La Grasse.—Also, an island in the Pacific ocean, near the coast of Peru, at the entrance of the harbour of Callao.

LAURENT *d'Aigouze, St.*, a town of France, in the department of the Gard; 15 miles S. of Nîmes.

LAURENT *d'Arce, St.*, a town of France, in the department of the Gironde; eight miles S.E. of Bourg.

LAURENT *de Cerdans, St.*, a town of France, in the department of the Eastern Pyrenées; nine miles S.W. of Cerat.

LAURENT *de Chamouffet, St.*, a town of France, in the department of the Rhone, and chief place of a canton, in the district of Lyons; 15 miles W. of Lyons. The place contains 1255, and the canton 10,978 inhabitants, on a territory of 182½ kilometres, in 14 communes.

LAURENT *sur-Gorre, St.*, a town of France, in the department of the Upper Vienne, and chief place of a canton, in the district of Rochechouart; 15 miles W.S.W. of Limoges. The place contains 2313, and the canton 13,519 inhabitants, on a territory of 265 kilometres, in nine communes.

LAURENT *de Médoc, St.*, a town of France, in the department of the Gironde, and chief place of a canton, in the district of Lesparre; 50 miles from Lesparre. The place contains 549, and the canton 3706 inhabitants, on a territory of 657½ kilometres, in six communes.

LAURENT *le Minier, St.*, a town of France, in the department of the Gard; six miles S.E. of Le Vigan.

LAURENT *du Motay, St.*, a town of France, in the department of the Mayne and Loire; nine miles S.E. of St. Florent.

LAURENT *des Mures, St.*, a town of France, in the department of the Here; nine miles S.E. of Lyons.

LAURENT *sur Oibais, St.*, a town of France, in the department of the Meuse; 12 miles N. of Eltain.

LAURENT *de la Plaine, St.*, a town of France, in the department of the Mayne and Loire; three miles S.W. of Chalonne.

LAURENT *du Pont, St.*, a town of France, in the department of the Here, and chief place of a canton, in the district of Grenoble; 12 miles N. of Grenoble. The place contains 3339, and the canton 11,551 inhabitants, on a territory of 182½ kilometres, in eight communes.

LAURENT *de Rividol, St.*, a town of France, in the department of the Aveyron; nine miles N. of Severac.

LAURENT *de la Salaque, St.*, a town of France, in the department of the Eastern Pyrenées; seven miles N.E. of Perpignan.

LAURENTALIA, or LARENTALIA, called also *Larentinalia, Laurentales, and Larentales*, feasts celebrated among the Romans on the tenth of the calends of January, or twenty-third of December, in memory of Acca Laurentia, wife of the shepherd Faustulus, and nurse of Romulus and Remus.

Acca Laurentia, from whom the solemnity took its name, is represented as no less remarkable for the beauty of her person, than her lasciviousness; on account of which, she was nick-named by her neighbours, *lupa, she-wolf*; which is said to have given rise to the tradition of Romulus and Remus being suckled by a wolf. She afterwards married a very rich man, who brought her great wealth; which, at her death, she left to the Roman people; in consideration of which they performed her these honours; though others represent the feast as held in honour of Jupiter Latiaris. See LARENTINALIA and LARES.

LAURENTEVA, in *Geography*, a bay or gulf of the Frozen sea, on the W. coast of Nova Zembla. N. lat. 72° 15'. E. long. 53° 14'.

LAURENTIA, in *Botany*, Mich. Gen. 18. t. 14, received its appellation from Micheli, in compliment to Dr. Mark

Mark Anthony Laurenti, a physician and professor at Bologna, whose botanical merits have not been transmitted to posterity, and the name is now sunk in that of *Lobelia*, to which article we refer the reader.

**LAURENTUM**, in *Ancient Geography*, a town of Italy, in Latium, of which it was for some time the capital; and supposed to have been the residence of king Latinus; situated upon the sea-coast, about eight miles S. of the capital.

**LAUREOLA**, in *Botany*, Spurge Laurel. See **DAPHNE**.

**LAURI**, FILIPPO, in *Biography*, painter of figures and landscapes. He was son of Baldassare Lauri of Antwerp, a landscape-painter of note, who settled at Rome, and died there in 1641.

Filippo was born in 1623; and became celebrated for cabinet pictures in the Flemish style of colour, but with a much more correct and refined taste of form than prevailed in that school; which most probably he acquired by residing with his father in Rome. His pictures are agreeably composed, touched with great spirit and freedom, of good colour and picturesque effect. Claude Lorraine paid him the compliment to employ him frequently to put figures in the fore-grounds of his landscapes; and in some of his best pictures, the hand of Lauri is discernible in the better proportion and beauty of touch with which the figures are wrought than in those completed by Claude's own hand.

The subjects he generally selected were those of nymphs, gods, and goddesses, and the like; where he could, with propriety, introduce much of the nude. To these he gave great ease in their actions, and composed them in a very agreeable manner. He died in 1694, at the age of 71.

**LAURI**, in *Botany*, a natural order of plants, to which *Laurus*, one of the number, gives its name; (the *Laurine* of Ventenat and Brown; see *Prod. Nov. Holl. v. 1. 401*.)—This is the 27th order of Jussieu's system, the fourth of his sixth class. There is nothing equivalent to it among the *Ordines Naturales* of Linnæus.

The characters of Jussieu's sixth class are.—Cotyledons two; petals none; stamens inserted into the calyx.—The calyx is of one leaf, either superior or inferior, entire or divided. Corolla wanting, but there are sometimes little scales, resembling petals, borne by the calyx. Stamens perigynous, or inserted into the calyx, definite or indefinite, both filaments and anthers distinct. Germen superior or inferior, or only invested with the calyx, simple, or rarely several in a definite number; style either solitary, or several in a definite number, or wanting; stigma simple or manifold. Seed naked, superior, or pericarp superior or inferior, often containing a single seed, rarely several. The situation of the embryo is various. Sometimes the flowers are of separate sexes.—The orders of this class are six; *Elaeagni*, *Thymelææ*, *Proteæ*, *Lauri*, *Polygonææ*, and *Atriplicææ*. It is one of those in which botanists differ most with respect to the application of the terms calyx and corolla. In the two first orders Linnæan botanists use the term calyx for what in the third and fourth is called corolla, and in the fifth and sixth again calyx. The analogy of one class, if truly natural, ought certainly to prescribe the use of the same term throughout, for the same part; but a question will but too frequently arise how far any class is really natural, or out of the reach of all exception; for, in every system, the leading sections, or classes, must be regulated by technical characters.

The order of *Lauri* is thus characterized:

Calyx divided into six parts, permanent. Stamens six, inserted into the lower part of each segment, or double that

number, six of them being interior; anthers combined with the filament, opening from the base upwards. Germen superior; style one; stigma simple or divided. Drupa or berry of one cell, containing a nut with one seed. Embryo destitute of albumen. Stem arboreous or shrubby. Leaves alternate, rarely opposite.

The genera are *Laurus*, *Porosfena*, Schreb. and *Douglasia*, Schreb. to which Mr. Brown has added *Endiandra*, *Cryptocarya*, *Tetranthera*, and the Linnæan genus *Cassipoua*.—Genera subjoined by Jussieu as allied to the *Lauri* are *Myristica*, *Virola* of Aublet, which Schreber properly reduces to *Myrsipica*, and *Hernandia*; to which list Mr. Brown adds *Cyrocarpus*; see that article. The excellent author last mentioned, accustomed, as has been said of Jortin and Goldsmith, to enrich every subject which he touches, has made the curious discovery of the cotyledons of the *Lauri* being peltate near their base. He has also remarked a strange inadvertence of Gærtner, who takes the cotyledons of *Cassipoua* for albumen, and the plumula for cotyledons. These parts, being rightly understood, admirably prove the true affinity of the genus, notwithstanding its parasitical and leafless habit.

**LAURI**, in *Geography*, a town of Naples, in Lavora; two miles S.W. of Sezza.

**LAURIA**, a town of Naples, in Basilicata; 17 miles E. of Policastro.

**LAURICAUCHA**, a mountain of Peru, abounding in silver ore; six miles N. of Paico.—Alfo, a lake of Peru; 80 miles N. of Lima.

**LAURIERE**, a town of France, in the department of the Upper Vienne, and chief place of a canton, in the district of Bellac; 18 miles E. of Bellac. The place contains 1407, and the canton 6502 inhabitants, on a territory of 145 kilometers, in seven communes.

**LAURINGEN**, a town of the duchy of Wurzburg, on the Laur; 30 miles N.E. of Wurzburg. N. lat. 50° 13'. E. long. 10° 32'.

**LAURISTO**, a town of Naples, in Principato Citra; 9 miles W.N.W. of Policastro.

**LAURINUM**. See **DAPHNELEON**.

**LAURISTAN**, in *Geography*, a town of Persia, in the province of Irak, on the Zenderoud; 90 miles W. of Ispahan.

**LAURO**, a town of Portugal, on a river of the same name, in the province of Alentejo; 27 miles W.N.W. of Evora.

**LAUROCERASUS**, in *Botany*, the Cherry-laurel, so called, from the laurel-like appearance of its leaves, as well as from the fruit; which is truly a cherry, and, though not wholesome, eatable, notwithstanding the very dangerous qualities of the rest of the plant. See **PRUNUS** and **LAUREL**.

**LAUROTAXA**, a name used by Columna, and some other authors, for the narrow-leaved kind of *rufus*, or butcher's broom, called by others *biflora*.

**LAUROW**, in *Geography*, a town of Hindoostan, in Bahar; 10 miles S.S.W. of Gayah.

**LAURUS**, in *Botany*, the ancient Latin name of the Bay-tree, for which it is retained by modern botanists, and along with which it now comprehends a great number of species, constituting one of the noblest genera in the whole vegetable kingdom. The origin of the word is lost in the obscurity of antiquity; and whether etymologists derive it from *lavo*, to wash, or from *laus*, praise or honour, they give us little more satisfaction in one case than the other.—Linn. Gen. 200. Schreb. 270. Willd. Sp. Pl. v. 2. 477. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 427. Sm. Prodr. Fl. Græc. Sibth. v. 1. 268. Juss. So. Journ. t. 367.

t. 367. Lamarec. Illustr. t. 321. Gærtn. t. 92.—(Borbonia; Plum. Gen. 3. t. 2. Perica; *ibid.* 44. t. 20.) Class and order, *Eucaendria Monogynia*. Nat. Ord. *Holeraceae*, Linn. *Lauri*, Jussl.

Gen. Ch. *Cal.* none, unless the corolla be taken for such. *Cor.* in six deep, ovate, pointed, concave, erect, alternately external segments. Nectary consisting of three pointed coloured tubercles, each terminating in two bristles, surrounding the germen. *Stam.* Filaments nine, shorter than the corolla, compressed, obtuse, three in each row; anthers attached to the edges of each filament, in the upper part, at each side. There are two globular glands, on a very short stalk, attached to every filament of the innermost row, near its base. *Pist.* Germen superior, nearly ovate; style simple, of equal thickness throughout, the length of the filaments; stigma obtuse, oblique. *Peric.* Drupa oval, pointed, of one cell, contained within the corolla. *Seed.* Nut ovate, pointed, with a kernel of the same shape.

Obs. Most of the species, including the Cinnamon and Camphor have united, or hermaphrodite, flowers; several are dioecious, as *L. nobilis*, the Sweet Bay, which has mostly from 8 to 14 filaments, and a deeply four-cleft corolla. The glandular bodies attached to some of the filaments, afford a discriminating character.

Ess. Ch. Calyx none. Corolla calyx-like, in six deep segments. Nectary of three glands, bearing two bristles, and surrounding the germen. Innermost filaments bearing glands. Drupa with one seed.

Linnaeus's 14th edition of *Syst. Veg.* has 16 species, Willdenow has 34, the increase being chiefly from the works of Swartz and Thunberg. Several still non-descript are in the hands of most collectors of tropical plants. The genus is extremely interesting on account of several fine and valuable aromatic species, as the Cinnamon, Cassia, Camphor, Sassafras, &c. The habit of the whole is arborecent. *Leaves* stalked, almost without exception alternate, undivided, entire, smooth and evergreen, more or less ovate or elliptical. *Flowers* mostly panicle, small, pale or greenish, not ornamental, but very curious in structure. *Fruit* large in proportion to the blossom. Mr. Brown expresses an intention of separating *Cinnamomum*, as a distinct genus from *Laurus*, as indeed it originally stood, till Linnaeus united them. It is extremely probable that other species require more accurate generic investigation than they have hitherto received, in which predicament we suspect is the *Sassafras* of North America, a tree with deciduous and partly lobed leaves. There appears also to be an oriental Sassafras wood, of a much more permanent though similar flavour to the American, of which we formerly procured a specimen at Venice, but of the tree that produces it we know nothing.

The following may suffice for examples of *Laurus* as the genus at present stands.

*L. Cinnamomum*. Cinnamon-tree. Linn. Sp. Pl. 528. (*Cinnamomum foliis latis ovatis frugiferum*; Burm. Zeyl. 62. t. 27. Cassia cinnamomea, five Cinnamomum; Herm. Lugduno-Bot.; 129. t. 655, 656.)—Leaves triply-ribbed near the base, ovate; lateral ribs vanishing near the top. Panicles repeatedly compound. Native of Ceylon, where, as well as in Amboyna, its importance as an object of cultivation, for the sake of its precious bark, is universally known. (See CINNAMON.) Concerning the botanical determination of the present species, there has always been some doubt, Linnaeus having defined it *foliis trinerviis*, that is, with three ribs distinct at the base, which is only so far true, that they are united to the mid-rib at a much less distance above the base, which is rounded, than those of *L. Cassia*. It seems moreover that this Cinnamon, like other cultivated plants,

is liable to many varieties, not only in quality, but in external configuration, and it may very possibly have originated from the *Cassia*, like apples from the wild crab. For a long while the true Cinnamon was scarcely to be seen in the herbulariums of Europe, but we have a specimen from Amboyna, by favour of the late Mr. Christopher Smith, in which the *panicles* are copious, longer than the *leaves*, repeatedly subdivided, and somewhat umbellate. The *flowers* are silky externally, and rather small. Linnaeus says they are dioecious. Another specimen, from the garden at the Mauritius, has narrower *leaves*, and much smaller panicles. The true Cinnamon is now not rare in the stores of curious collectors. The bishop of Winchester, many years since, raised it from seeds ripened in his own garden.

*L. Cassia*. Cassia-bark-tree. Linn. Sp. Pl. 528. (Carua; Rheede Hort. Mal. v. 1. 107. t. 57.)—Leaves triply-ribbed far above the elongated base, elliptic-lanceolate; lateral ribs vanishing beyond the middle. Panicles corymbose.—Native of Malabar, Sumatra, Java, &c. The narrower *leaves*, tapering at each end, and the very different qualities of the bark, which is more mucilaginous and far less gratefully aromatic, distinguish this from the preceding, whether it be a species, or only a variety. Rheede says, the bark of the *root* yields camphor.

*L. Camphora*. Japanese Camphor-tree. Linn. Sp. Pl. 528. Jacq. Coll. v. 4. 221. t. 3. f. 2. Kämpf. Amoen. 770. t. 771. (Arbor camphorifera japonica; Commel. Hort. Amit. v. 1. 185. t. 95.)—Leaves elliptical, pointed, triply-ribbed far above the elongated base. Clusters axillary, somewhat compound, shorter than the leaves. Native of Japan, often to be seen flowering in the English robes. The curious structure of the *blossoms* may be seen in Jacquin. The Japanese camphor is believed to be obtained by distillation from this tree, that of Borneo and Sumatra being the produce of one of a different species, if not genus, of whose botanical characters little is known. This latter is erroneously called *Laurus Camphora* in our article CAMPHOR, to which we refer the reader.

*L. nobilis*. Common Bay-tree. Linn. Sp. Pl. 529. (Laurus; Camer. Epit. 60. Ger. em. 1407.)—Leaves lanceolate, veiny, finely reticulated, evergreen. Flowers four-cleft, dioecious, in short axillary clusters. Native of Italy and Greece, almost perfectly hardy in our climate, being one of the most desirable evergreens we have, though of slow growth. The *leaves* are of a rich deep green, highly and pleasantly aromatic. *Flowers* born by old trees only, pale yellow. *Fruit* black, the size of an unripe olive, strongly aromatic, never, as far as we know, perfected in England, but plentiful in Italy. This is certainly the *δαφνη* of Dioscorides, and consequently the classical laurel. It is still called by the same name among the modern Greeks. There is a broad-leaved variety, called *δαφνη πλαυιτιχη* in Dioscorides.

*L. aestivalis*, *Benzoin* and *Sassafras*, three North American species, have deciduous leaves. The true Benjamin tree, or Gum Benzoin (see those articles) is not, as Ray supposed, this *Laurus Benzoin*, but a species of *Styrax*, as was first shown by the late Mr. Dryander in the Philosophical Transactions for 1787, p. 307. t. 12. See STYRAX.

L A U R U S, in Gardening, comprises plants of the evergreen and deciduous tree kinds, for borders, green-houses, and sloop, of which the species cultivated are the common sweet bay (*L. nobilis*); the willow-leaved bay (*L. ætivalis*); the common Benjamin-tree (*L. benzoin*); the sassafras-tree (*L. salifras*); the royal bay, or Indian laurel (*L. indica*); the broad-leaved Carolina bay, or red bay (*L. borbonica*); the camphor, or camphire-tree (*L. camphora*);

phora); the cinnamon-tree (*L. cinnamomum*); the cassia, or wild cinnamon-tree (*L. cassia*); and the alligator pear (*L. persea*).

The first sort has several varieties, as the broad-leaved, which is almost too tender for the open air in this climate, with leaves much broader and smoother than those of the common sort: the common, which is seldom hurt in this climate, except in very severe winters, of which there are two subvarieties, one with plain leaves, the other with leaves waved on the edges: the narrow-leaved, with very long narrow leaves, not so thick as those of the preceding two sorts, and of a light green, the branches covered with a purplish bark, and the male flowers come out in small clusters from the axils of the leaves, fitting close to the branches; of which there are subvarieties in the nurseries with variegated leaves. What is now called bay, was formerly called laurel, which has introduced some confusion.

It may be noticed, that the chief of the camphor used in Europe is prepared from this tree in Japan, by splitting the wood into small pieces, and subliming or distilling it with water in an iron retort, covered with an earthen or wooden head, in the hollow of which they fasten hay or straw, to which the camphor, as it rises, adheres. This camphor is brownish or white, but in very small semi-pellucid grains. It is packed up in wooden casks, and thus sent to India and Europe, where it is purified by a second sublimation, and reduced into the solid mass as found in the shops. Native camphor, or the Capoor Baroos of the Malays, is a production obtained in Sumatra and Borneo, by cutting down the trees, and splitting them with wedges into small pieces, the camphor being found in the interstices in the flate of a concrete crystallization. Some have asserted that it is from the old trees alone that this substance is procured, and that in the young trees, if it is in a fluid state, it is called Meenio Capoor, or camphor oil; but this is a mistake: the same sort of tree that produces the fluid does not produce the dry, transparent, flaky substance, nor ever would. They are readily distinguished by the natives. Many of the trees, however, produce neither the one nor the other. The traders usually distinguish three degrees of quality, by the names of head, belly, and foot, according to its purity and whiteness. Some add a fourth sort, of extraordinary fineness, of which a few pounds only are imported to Canton, and sell there at the rate of two thousand dollars the pekul.

The common camphor will evaporate till it wholly disappears; while that of Sumatra and Borneo, called native camphor, though subject to some decrease, does not appear to lose much in quantity from being kept.

Camphor oil is obtained by the Sumatrans by making a transverse incision into the tree, to the depth of some inches, and then cutting slopingly downwards from above the notch, till a flat horizontal surface be left. This they hollow out, till it is of a capacity to receive a quart: then put into the hollow a bit of lighted reed, and let it remain for about ten minutes, which acting as a stimulus, draws the fluid to that part. In the space of a night the liquor fills the receptacle previously made. The trees are soon exhausted.

The eighth sort has several varieties; but it is the Ceylon cinnamon that is chiefly used as a spice.

*Method of Culture.*—The first sort may be increased by feed, layers, and suckers. The feed should be sown soon after the berries are ripe, or early in the spring, either in beds, covering them with earth near an inch deep, or in drills half a foot asunder, the same depth. When the plants are come up, they should be supplied with frequent waterings during the summer, and in winter defended from severe frost by the

shelter of mats, or some other covering, being tender while young; and after having two summers' growth in the feed-bed, in the spring following the strongest should be removed into nursery rows, one or two feet asunder, and a foot apart in each row, giving water in dry weather, till they have taken good root, and keeping them clear from weeds. When they are half a yard, or two or three feet high, they are of proper growth for transplanting into the shrubbery in autumn or spring. The berries may also be sown in pots, and plunged into a hot-bed in spring, which brings the plants forwarder, being careful to inure them to the full air in the summer season.

In the layer, some of the lower branches that are well furnished with young shoots, may be laid down in the early spring, or in August, but the latter is the best season; each shoot being slit-layed; they become rooted in one year, when in spring following they may be taken off, and planted in the nursery, in the manner directed for the seedlings.

Where suckers are had recourse to, they should be taken up with good roots in autumn or spring, and be planted in the nursery like the seedlings and layers.

This sort is also capable of growing by cuttings, planted in the beginning of April on a moderate hot-bed of tanners' bark covered eight inches deep with rich loose fresh earth, five inches deep, and eight or nine asunder, rubbing off their leaves, and watering them gently every evening while the bed continues warm, covering the glasses with mats during the heat of the day. When the cuttings have shot roots, they should receive all mild gentle showers, and the evening dews. In the beginning of August, the glasses may be taken off, being replaced when the weather begins to be frosty; keeping them open every mild day. In the beginning of the April following, or as soon as the weather becomes temperate, both glasses and frames should be removed, continuing frequent and plentiful waterings during the summer months, as the weather may require; and in the succeeding April the plants will be strong, well rooted, and fit for planting out.

At the period when the plants raised in these ways are removed to the nursery, they should have their superfluous roots and branches cut away, encouraging the leading shoots; planting them in a well sheltered quarter of light mould. The ground should be dug over in autumn and spring, keeping it clean, loose, and mellow in summer, and the plants be annually pruned in April.

The gold-striped variety is tender, being commonly kept in pots, and housed with hardy green-house plants. When it stands in the open ground, it is sometimes much injured in severe winters. The method of increasing it is by budding it on the plain foot.

And the broad-leaved and narrow-leaved varieties are not so hardy as the common sort, being scarcely able to live abroad whilst young, in common winters, without shelter. As in severe winters the old trees are frequently killed, or at least the branches much injured, the plants are frequently kept in tubs, and housed in the winter season.

The second, third, and fourth sorts may be increased by feed, by layers, and sometimes by suckers and cuttings. The feeds or berries procured from America, and preserved in sand, should be sown, as soon after they arrive as possible, in a bed of light earth an inch deep, or in largish pots the same depth, plunging them in mould, in an eastern border, up to their rims, till the spring following; when they should be placed in a hot-bed, which greatly forwards the germination of the feed, and soon brings up the plants. They must be timely inured to the full air. The plants raised by either method should, while young, be watered during summer,

and sheltered from the frost in winter, and when two years old be planted out in nursery rows, as directed for the other plants. They may also be increased by layers and suckers in the same manner as directed for the fir-tree; but it is sometimes long before the layers are rooted.

They are likewise sometimes capable of being increased by cuttings, by the aid of a good hot-bed.

And the fifth, sixth, and seventh forts may be increased by layers, but they are sometimes two years before they are sufficiently rooted. They may also be raised from seeds, procured from the places of their natural growth, sowing them in pots, and plunging them in a hot or bark-bed; but without this aid they do not always grow freely the first season; in which case they should be placed in the open air in summer, and in a frame, or in the green-house, near the windows, in winter; and in spring the pots be plunged in a hot-bed, which will bring up the plants, giving air daily, and frequent waterings, and injuring them by degrees to the open air as the summer advances; placing them in shelter in winter, and in the following spring planting them out in separate small pots, managing them as other green-house shrubs.

The eighth, ninth, and tenth forts are also raised by layers and seed, sown and managed as above, generally assisted by the bark-bed of the stove; the plants being planted off into separate pots, and managed afterwards as other hot-house plants.

It may be noticed that the first, second, third, and fourth forts are highly ornamental in the borders and clumps of pleasure grounds; the three following in green-house collections; and the three last among other stove plants.

**LAURUSTINE**, a name often given to a fine evergreen flowering shrub. See *VIBURNUM TINUS*.

**LAUS**, in *Ancient Geography*, a town of Italy, in the territory of the Laconians; founded by the Sybarites, but afterwards taken possession of by the Lycaonians, a colony of the Samites.

**LAUS POMPEIA**, a town of Gallia Transpadana towards the S.E.; founded by the Boii, and afterwards belonging to the Infubrians. It was a Roman colony and municipal.

**LAUS KAUREN**, in *Geography*, a peninsula of Finmark, in the Frozen sea. N. lat.  $70^{\circ} 45'$ . E. long.  $30^{\circ} 24'$ .

**LAUSANNE**, a city of Switzerland, in the canton of Berne, and the largest town in the Pays de Vaud, and by the French division of 1798 the capital of the department and canton of Leman, is beautifully situated on the declivities of three hills, and in the intermediate vallies, environed by an old wall, and distant two miles from the lake of Geneva, and 37 miles N.E. from Geneva itself. The district to which it gives name was once a republic itself, but afterwards annexed to the canton of Berne, and is a considerable tract, lying below the border of Vevey and Venoge, about 13 miles in length and five in breadth. The ascent upon which the town is built is so steep, that in some places the horses cannot, without great difficulty, draw up a carriage, and foot passengers ascend to the upper part of the town by steps. These inconveniences, however, are amply compensated by the sublimest views in nature, commanding the lake of Geneva, the Pays de Vaud, and the rugged coast of Chablais.

The church is a magnificent Gothic building, having been formerly a cathedral, while the Pays de Vaud was subject to the house of Savoy. It stands on the most elevated part of the town; and contains, among many other sepulchres, the tomb of Amadeus VIII. duke of Savoy, styled the Solomon of his age, but more known by the name of the anti-pope Felix V., who exhibited a singular instance in the annals of Europe of a personage twice abdicating the pomp of

sovereignty, and twice retiring to a private station. The number of inhabitants, according to Coxe, is about 7000; Pinkerton states them at 9000. In the year 1536, when part of the Pays de Vaud was conquered from the house of Savoy, the bishop of Lausanne retired from the town, and the inhabitants put themselves under the direction and sovereignty of the canton of Berne, which granted to it new privileges, in addition to those which it had formerly possessed. The reformation was introduced by Pierre du Viret in the same year. The bishop's diocese formerly comprehended the greater part of the cantons of Berne, Soleure, and Friburg, the Pays de Vaud, the principality of Neuchâtel, Bienna and its territory, and the country of Erguel, and extended almost to Franche Comté. Since the reformation, it has been reduced to little more than the canton of Friburg and a part of that of Soleure. Lausanne chooses its own magistracy, which consists of a burgomaster, five bannerets, the town council, the council of sixteen, and the great council. An academy was established here in 1537, and a college in 1540. Professors in every science are appointed by government, and there is a tolerable library for the use of the public. The bailiwick of Lausanne is extensive; the bailiff, who is chosen every six years, succeeded to the bishop, and has equal jurisdiction. The air of Lausanne is very pure and healthy; and it has plenty of excellent water, with every necessary of life in the greatest abundance. Lausanne is not only governed by its own magistrates, and has its own courts of justice; but the burghers, who possess houses in the principal street, enjoy the right of pronouncing sentence in criminal causes. The criminal is tried by the civil power; if he is found, and acknowledges himself guilty, one of the magistrates pleads in defence of the prisoner, and another against him; the court of justice gives an opinion upon the point of law, and the majority of the burghers above-mentioned determine the penalty. If the punishment is capital, there is, according to the letter of the law, no pardon, unless obtained within twenty-four hours from the sovereign council of Berne, although it generally happens that eight days are granted for that purpose. When the criminal is seized within the jurisdiction of the town, the fact is tried, and the burghers pronounce sentence in the town-hall; in this case there is no appeal. But when he is taken within the district of the bailiff, they assemble in his house, and an appeal lies from their determination to Berne. Lausanne is 41 miles S.W. of Berne. N. lat.  $46^{\circ} 33'$ . E. long.  $6^{\circ} 28'$ . Coxe's Travels in Switzerland, vol. ii.

**LAUSSIG**, a town of Saxony, in the circle of Leipzig; 14 miles S.E. of Leipzig. N. lat.  $51^{\circ} 7'$ . E. long.  $12^{\circ} 36'$ .

**LAUSSNITZ**, a town of Saxony, in the margravate of Meissen; 13 miles N. of Dresden.

**LAUSZA**, a town of Samogitia; 44 miles N.W. of Miedniki.

**LAUT**. See *PULO LAUT*.

**LAUTAKARI**, a small island in the N. part of the gulf of Bothnia. N. lat.  $65^{\circ} 35'$ . E. long.  $24^{\circ} 34'$ .

**LAUTENBURG**, a town of Prussia, in the territory of Culm; 48 miles E. of Culm.

**LAUTER**, a town of Germany, in the county of Henneberg; 11 miles N.E. of Meiningen.

**LAUTERBACH**, a town of Bohemia, in the circle of Saatz; 65 miles W. of Prague. N. lat.  $50^{\circ} 2'$ . E. long.  $12^{\circ} 45'$ .—Also, a town of Upper Hesse; 13 miles N.W. of Fulda.

—Also, a town of Saxony, in the circle of Erzgebirg; five miles N.W. of Zwickau.

**LAUTERBERG**, a town of Westphalia, in the Hartz

Hartz forest, near which are mines and forges of copper and iron; 14 miles S. of Gosslar.

LAUTERBOURG, a town of France, in the department of the Lower Rhine, and chief place of a canton, in the district of Wissembourg, situated on the Lauter. The place contains 1941, and the canton 9782 inhabitants, on a territory of 180 kilometres, in 10 communes; 29 miles N.N.E. of Straßburg. N. lat. 49°. E. long. 8° 14'.

LAUTERBRUENNEN, a valley of Switzerland, in the canton of Berne; six miles S. of Interlachen, and about 15 miles in circuit, embosomed in the midst of the Alps, and celebrated for its picturesque and romantic scenery. The western boundary, from which the Staubbach falls, forming a cataract, would, in any other country, be called an enormous mountain; it here appears only a trifling hill, in comparison with the opposite chain, of which the highest point is the beautiful Jungfrau-horn, that stretches in a semi-circular direction, and, towering above the adjacent peaks, rises to a stupendous height. At the extremity of the vale, there are some noble points of view, and glaciers which stretch from the foot of the Breithorn and Gros-horn. In this delightful valley, many streams of the clearest water gush from the earth like small rivers, and numberless torrents precipitate themselves from the mountain. From this circumstance the valley derives its name; *Lauterbrunnen* signifying, in German, *many springs*. One of the peaks, adjoining to this valley, which is called the Gros-horn, is of a pyramidal shape, and capped with frozen snow; another, the Breithorn, is conical, and seems crowned with an enormous mass of transparent ice, from which the reflection of the sun-beams is inexpressibly beautiful. But the most elevated and the most majestic of the whole group, is the Jungfrau-horn. (See JUNGFAU.) The hollows between the mountains are filled with large valleys of ice, broken into various shapes, and several torrents, bursting from the snow, and uniting in their course, form the Weits-Lutchine, a river which rolls rapidly through the valley of Lauterbrunnen, joins the Schwartz-Lutchine, which flows from Grindewald, and swells the Aar. This valley is bordered by calcareous rocks to its furthest extremity. Wengenalp is the last of a group of calcareous and schistous mountains between Lauterbrunnen and Grindewald, which there joins the Jungfrau, the summits of which appear to be of granite. Cox's Travels, vols. i. and ii.

LAUTERKEN, a town of France, in the department of Mont Tonnerre, and chief place of a canton, in the district of Kaiserslautern; 24 miles N. of Deux Ponts. The place contains 627, and the canton 4594, inhabitants, in 21 communes. N. lat. 49° 39'. E. long. 7° 35'.

LAUTERHOFEN, a town of Bavaria; 12 miles S.W. of Sulzbach.

LAUTERN, a town of Prussia, in the province of Ermeland; 14 miles S.S.E. of Heilsberg.

LAUTERSHAUSEN, a town of Germany, in the principality of Anspach, on the Altmuhl; eight miles W. of Anspach.

LAUTERSTEIN, a town of Saxony, in the circle of Erzgebirg; 17 miles S.S.W. of Freyberg.

LAUTREC, a town of France, in the department of the Tarn, and chief place of a canton, in the district of Castres; 12 miles N.N.W. of Castres. The place contains 3238, and the canton 7548 inhabitants, on a territory of 147½ kilometres, in 12 communes.

LAUTTE, a town of Prussia, in Oberland; 16 miles E.S.E. of Marienwärdner.

LAUVNS, a town of France, in the department of the Lower Pyrenæes; 15 miles S.E. of Oleron.

LAUZERTE, a town of France, in the department of the Lot, and chief place of a canton, in the district of Montauban; 17 miles N.W. of Montauban. The place contains 3608, and the canton 12,176 inhabitants, on a territory of 232½ kilometres, in 16 communes. N. lat. 44° 15'. E. long. 1° 13'.

LAUZES, a town of France, in the department of the Lot, and chief place of a canton, in the district of Cahors. The place contains 444, and the canton 7139 inhabitants, on a territory of 237½ kilometres, in 11 communes.

LAUZET, LE, a town of France, in the department of the Lower Alps, and chief place of a canton, in the district of Barcelonnette; 10 miles W. of Barcelonnette. The place contains 857, and the canton 5038 inhabitants, on a territory of 295 kilometres, in seven communes.

LAUZUN, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Marmande; 14 miles N.E. of Marmande. The place contains 1809, and the canton 12,852 inhabitants, on a territory of 220 kilometres, in 17 communes. N. lat. 44° 38'. E. long. 0° 32'.

LAW, EDMUND, in *Biography*, a learned English prelate, the son of a clergyman, in the neighbourhood of Cartmel, in Lancashire, was born in the year 1701. He received the greater part of his classical learning at the free grammar school of Kendal, from which place he was sent to St. John's college, Cambridge. He was admitted to the degree of B. A. in 1723, and soon afterwards was elected fellow of Christ's college. During his residence in this college, he became known to the public by a translation of archbishop King's "Essay upon the Origin of Evil," with notes. To this work was prefixed "A preliminary dissertation," by the Rev. Mr. Gay of Sidney college. In the controversy which took place in consequence of Dr. Clarke's "Demonstration of the Being and Attributes of God," Mr. Law took a part, and among other things published his "Enquiry into the Ideas of Space, Time, &c." In the year 1735, a new and improved edition of Robert Stephens' "Thesaurus Linguae Latinae" was given to the public, and in the preparation of this valuable work, Mr. Law had a considerable share. In 1737, he was presented by the university to the living of Graystock, in the county of Cumberland, worth about 300*l.* per annum. In 1743, he was promoted by sir George Flemming, bishop of Carlisle, to the archdeaconry of that diocese, and, in 1746, went from Graystock to reside at Salkeld, a pleasant village upon the banks of the river Eden, the rectory of which is annexed to the archdeaconry. During his residence at this place, he published his "Considerations on the Theory of Religion;" to which he subjoined "Reflections on the Life and Character of Christ;" and an appendix concerning the use of the words "Soul and Spirit." In 1749, Mr. Law proceeded doctor of divinity; in his public exercise for which degree, he defended the doctrine of what is usually denominated "The sleep of the soul." In 1754, he was elected master of Peter-house, in Cambridge, and in the following year appointed head librarian of the university; a sinecure place, with a salary of fifty pounds a-year. He received almost every year some additional preferments, which were rather honourable expressions of regard from his friends, than of much advantage to himself: in 1767, he obtained a stall in the church of Durham, and in 1769, on the recommendation of the duke of Grafton, he was nominated bishop of Carlisle, and was permitted to hold, in connection with the bishopric, the mastership of Peter-house, and the rectory of Graystock. In 1774, he published a very valuable treatise, entitled "Considerations on the Theory of Religion,"

Religion," which has passed through at least eight editions. The object of this work was to shew that arts and sciences, natural and revealed religion, have upon the whole been progressive, from the creation of the world to the present time; as also that they have been suited to each other, as well as to the circumstances of mankind, during each eminent period of this their progression. In 1777, Dr. Law gave the public a handsome edition, in four vols. 4to. of the works of Mr. Locke, with a life of the author, and a preface. In the edition of the "Considerations," published at Carlisle in 1784, he made such alterations as shewed that he had given up the doctrine of the pre-existence of Christ, a fact which he noticed to a friend in pretty strong language. Dr. Law died in August 1787, in the 84th year of his age. The life of Dr. Law was a life of incessant reading and thought, almost entirely devoted to metaphysical and religious enquiries. The leading peculiarity of his religious sentiments is, that "Jesus Christ will, at his second coming, by an act of his power, restore to life and consciousness the dead of the human species, who, by their own nature, and without his interposition, would remain in the state of insensibility, to which the death, brought on mankind by the sin of Adam, had reduced them." Dr. Law published, besides the articles already mentioned, some single sermons; a tract on "The Nature and Necessity of Catechising;" "A Defence of Mr. Locke's Opinion concerning personal Identity;" and "Observations occasioned by the Contest about literary Property." See life prefixed to an edition of his Reflections printed by Johnson in 1803.

LAW, JOHN, a famous projector, the son of a goldsmith in Edinburgh, was born about the year 1681. It appears that he was not brought up to any profession, but having a turn for calculation, he made himself a proficient in numbers, and in the speculations depending upon them. He obtained, while very young, the confidence of the king's ministers for Scotland, and was employed by them to arrange the revenue accounts, which were at that time in great disorder. To remedy the want of a circulating medium he proposed the establishment of a bank, which, according to his plan, might issue paper-money to the amount of the value of all the lands in the kingdom. This was not adopted. At the death of his father he succeeded to a small estate, and commenced the fine gentleman, supplying the deficiency of his income by gaming. In consequence of a duel, in which he killed his antagonist, he was obliged to leave the country. He visited Venice and Genoa, from which cities he was banished as a sharper; he wandered through Italy, supporting himself by his wits, chiefly by the success of singular wagers, in which, by his skill in calculation, he always took care that the chances should be in his favour. He proposed his financial scheme to Louis XIV. who listened to his plans. A bank was established, composed of 1200 shares of 3000 livres each; to this was annexed a Mississippi company, who had grants of land in Louisiana, and was expected to realize an immense sum by planting and commerce. To this were afterwards joined the trade of Senegal, and the privilege of the old East India company. In 1718, it was declared a royal bank; and by a number of advantages arbitrarily conferred upon it, such were the extent of its business, and the magnitude of its funds, that its shares rose to twenty times their original value. All France was seized with the rage of gambling in the funds. Money and valuables of all kinds were brought to the market and invested in bank paper, and those thought themselves truly happy who could strip themselves of every thing for a participation in this imaginary wealth. In 1720, Law was made comptroller-general of the finances. Regarded as the Plutus of the kingdom, he saw

at his levee dukes, peers, and marshals of France. At length the baseless fabric of this prosperity began to give way: the shares sunk daily in value, and the ruin of the system seemed to be inevitable. He was obliged to resign his post, after holding it only five months; and loaded with the public execrations, retired first to an estate in the country, and then, for further safety, quitted the kingdom. He now passed the remainder of his days in obscurity, occupied, however, with his projects, fully convinced of the solidity of his system, the failure of which he attributed to the opposition it met with. He died at Venice in 1729.

LAW, WILLIAM, a learned and pious divine of the church of England, was born at King's-Cliffe, Northamptonshire, in 1686, and educated at Oxford, where he took his degrees. He entered into holy orders, but it does not appear that he ever had the cure of souls, owing probably to his adherence to non-juring principles, which he maintained to the close of his life. He was some time a private tutor in a gentleman's family at Putney, after which he chiefly resided in a very retired way at the house of Mrs. Hester Gibbon, aunt of the celebrated historian, in Northamptonshire, where he died in 1761. He was author of a great many theological publications, of which the most important is "The serious Call to a devout and holy Life, adapted to the State and Condition of all Orders of Christians." His "Practical Treatise on Christian Perfection" was likewise very much esteemed. He entered the lists against bishop Hoadley; and was a zealous disciple of the doctrines of Jacob Behmen, whose works he published.

LAW, in its most general and comprehensive sense, signifies a rule of action; and is applied indiscriminately to all kinds of action; whether animate or inanimate, rational or irrational; in which sense it is used when we say, the laws of motion, of gravitation, of optics, or mechanics, as well as the laws of nature and of nations. Accordingly law is a command or precept, constituting a rule of action, and coming from some superior authority, which an inferior is obliged to obey; or, according to some, law is a command, or mandate of some person, or power, whose precept carries with it the reason of obedience: or, it is a rule of action, that obliges by virtue of its being the will of a superior. See OBLIGATION.

The word is formed from the Saxon *lab, laga*, which signifies the same.

Thus, the commands of God with respect to men, of a city with respect to the citizens, and universally of all powerful beings in respect to those who cannot resist, are called their laws.

The nature of a law will be most clearly discovered by shewing wherein it differs from *covenant, counsel, and right or equity*; with all which it is frequently confounded.

Law is confounded with covenant, or compact, by those who take laws to be nothing else but *συνδοχαιματα*, or forms of living determined by the consent of mankind; among whom is Aristotle, who defines a law, "a declaration determined by the common consent of a city, shewing in what manner things are to be done:" which is not so much the definition of a law, as of a *civil law*; nor yet properly of a civil law; for this common consent is no more than a mutual covenant, which does not oblige any person, and consequently is not any law, till some supreme power be constituted with a power to compel, and to make it penal to transgress it. Here then the covenant is confounded with the law, which leads into absurdities; for a covenant or compact is a promise proceeding from us; a law, a command directed to us.

The difference between a counsel and a law is this :

A counsel is a precept, wherein the reason of obedience is taken from the thing itself prescribed; a command is a precept, wherein the reason of obedience depends on the will of the prescriber; for we cannot properly say, *ſic volo, ſic jubeo*, unleſs *ſit pro ratione voluntas*. A law comes from a perſon who has a power over thoſe whom he commands; a counſel, from him who has no ſuch power. To do what is enjoined by a law, is an act of duty; what by a counſel, an act of choice, or freewill. Counſel is only matter of perſuaſion, law is matter of injunction; counſel acts only upon the willing, law upon the unwilling alſo.

Law is confounded with right or equity, by thoſe who perſiſt in doing what is permitted by the *divine* law, though prohibited by the laws of the country. What is prohibited by the *divine* law, cannot be permitted by the *civil* law; nor what is commanded by the *divine* law, be prohibited by the *civil* law; but what is permitted by the *divine* law, may, notwithstanding, be prohibited by the *civil* law: for the inferior laws have a power of reſtraining the liberty left by the ſuperior laws, though they cannot enlarge it. Now right or equity is a natural liberty, not conſtituted by laws, but free of them; for take away laws and liberty is complete.

This liberty is firſt reſtrained by the *natural* and the *divine* law, the reſt reſtrained by the *civil* laws; and what remains unreſtrained by the *civil* law, may be again reſtrained by the conſtitution of particular cities and ſocieties. There is a great difference, therefore, between law and right, *lex & jus*; for law is a chain; but right a liberty; and they differ as two contraries. See *Civil or Municipal LAW, infra*.

Law may be divided, with reſpect to its different original, into *divine* and *human*.

Law, *Divine*, may be conſidered as twofold, with reſpect to the two different manners in which God notifies or announces his will to man; *viz. natural (or moral), and poſitive*.

Law, *Natural*, is that which he has made known to all mankind, by an innate light, called *natural reaſon*.

*Natural* law may be divided into that natural law of men, which, in a peculiar ſenſe, is called the *LAW of nature*; and the natural law of countries, commonly called the *LAW of nations*. (See each of theſe articles.) The precepts are the ſame in both theſe; but becauſe, when ſocieties are once inſtituted, certain perſonal properties become veſted in men; that law, which, when we ſpeak of the duties of men ſeverally, we call the *natural law*, when transferred to cities or countries, we call the *law of nations*.

M. Regis ſays, that the laws of nature are the dictates of right reaſon, which teach every man how he is to uſe his natural right; and the laws of nations, the dictates, in like manner, of right reaſon, which teach every ſtate how to act and behave themſelves toward others.

Law, *Poſitive*, is that which God has revealed by his prophets, or by perſons ſupernaturally commiſſioned and inſpired and found only in the holy ſcriptures: ſuch are thoſe laws delivered to the Jews, relating to the divine worſhip and polity, which may be called *divine civil* laws, as being peculiarly directed to that people. As the matter of *natural* laws is ſomething in its own nature good and neceſſary, theſe laws are founded in the immutable natures and relations of things, carry with them their own recommendation, and if it were not for the depravity of mankind, would not need a ſupernatural light for the diſcovery of their reaſonableneſs and obligation. Whereas poſitive laws differ from the former, both with regard to the *matter* of them, as well as the *manner* of their publication. Theſe may be diſtinguiſhed into ſuch as are *purely* poſitive, or *partly* ſo. The matter of

*purely* poſitive laws is indifferent; ſo that the poſitive decree of the legiſlator alone makes them to be laws, mere reaſon being then ſilent. Such were the ceremonial laws of the Jews, and ſuch are the ſacraments of the Chriſtian religion. Nevertheless, every poſitive law is founded in reaſon, though reaſon may not be able, antecedently to their promulgation, to diſcover their fitneſs and utility. But the reaſons that recommend them, when they are actually promulgated, would not give them the authority and ſanction of a law, without the expreſs intention of the ſupreme lawgiver. Laws that are *partly* poſitive may be reſolved into the law of nature, or the moral law as revived, improved, and enforced by revelation. Several particulars of this law derive a greater degree of evidence from this new mode of promulgation, and alſo a ſtronger enforcement. The law concerning the ſabbath is in a peculiar ſenſe a law of this kind, the matter of it being of a mixed nature. That ſome part of our time ſhould be conſecrated to the worſhip of our creator, the light of nature dictates; but that it ſhould be a ſeventh part rather than any other, or the laſt ſeventh rather than the firſt, or the third, is not natural but poſitive.

Law of Nature, as it reſpects intelligent, moral, and accountable beings, is the will of God, relating to human actions, grounded in the moral differences of things; and becauſe it is, in ſome meaſure, diſcoverable by natural right, it is obligatory upon all mankind. It is thus defined by Cicero (D: Legibus, lib. i) “Lex eſt ratio ſumma inſita in natura quæ jubet ea quæ faciendæ ſunt, prohibetque contraria.” It is called the law of nature, on account of the manner of its promulgation, which is by natural reaſon; on account alſo of its ſource or foundation, this law reſulting from the reſpective natures of beings and things, of beings, as God and man, and of things or actions, as morally good or evil, and having different physical effects; and, moreover, becauſe it is the law of God. Nature is but a fictitious perſon; and all that is ſaid of the wiſdom of her deſigns and operations, of her power, or of her laws, is to be aſcribed to him who is the author of nature. “Quid enim eſt aliud natura, quam Deus et divina Ratio, toti mundo, et partibus ejus inſerta?” Seneca de Benef. l. vi. c. 7. The demonſtration of this law of nature has been attempted by ſeveral learned men, who commonly urge the conſent of the more civilized nations, as a good argument for the exiſtence of this law. “Omni autem in re conſenſio omnium gentium lex natura putanda eſt,” ſays Cicero; i. e. “as to any point, the agreement of all nations in it is to be eſteemed a law of nature.” Others have erroneouſly alleged, as a proof of the law of nature, innate ideas or practical principles, impreſſed on the ſoul of man by its creator: but of ſuch ideas and principles we have no evidence. A more direct and concluſive demonſtration of the law of nature may be deduced from the conſideration both of the divine and human nature; which beheld in one view and in the relation they bear to each other ſupply unequivocal evidence of the exiſtence and obligation of this law. To this purpoſe we ſhall avail ourſelves of ſome appropriate reflections and reaſonings of the learned judge Blackſtone in immediate connection with this ſubject. “As God,” ſays this learned writer, “when he created matter, and endued it with a principle of mobility, eſtabliſhed certain rules for the perpetual direction of that motion; ſo, when he created man, and endued him with freewill to conduct himſelf in all parts of life, he laid down certain immutable laws of human nature, whereby that freewill is in ſome degree regulated and reſtrained, and gave him alſo the faculty of reaſon to diſcover the purpoſe of thoſe laws.”

Conſidering the Creator only as a being of infinite power, he

he was able unquestionably to have prescribed whatever laws he pleased to his creature, man, however unjust or severe. But as he is also a being of infinite *wisdom*, he has laid down only such laws as were founded in those relations of justice, that existed in the nature of things antecedent to any positive precept. These are the eternal, immutable laws of good and evil, to which the Creator himself in all his dispensations conforms; and which he has enabled human reason to discover, so far as they are necessary for the conduct of human actions. Such among others are these principles: that we should live honestly, should hurt nobody, and should render to every one his due; to which three general precepts Justinian has reduced the whole doctrine of law.

But if the discovery of these first principles of the law of nature depended only upon the due exertion of right reason, and could not otherwise be obtained than by a chain of metaphysical disquisitions, mankind would have wanted some inducement to have quickened their inquiries, and the greater part of the world would have rested content in mental indolence, and ignorance its inseparable companion. As therefore the Creator is a being, not only of infinite *power*, and *wisdom*, but also of infinite *goodness*, he has been pleased so to contrive the constitution and frame of humanity, that we should want no other prompter to inquire after and pursue the rule of right, but only our own self-love, that universal principle of action. For he has so intimately connected, so inseparably interwoven the laws of eternal justice with the happiness of each individual, that the latter cannot be attained but by observing the former; and, if the former be punctually obeyed, it cannot but induce the latter. In consequence of which mutual connection of justice and human felicity, he has not perplexed the law of nature with a multitude of abstracted rules and precepts, referring merely to the fitness or unfitness of things, as some have vainly surmised; but has graciously reduced the rule of obedience to this one paternal precept, "that man should pursue his own true and substantial happiness." This is the foundation of what we call ethics, or natural law. For the several articles into which it is branched in our systems, amount to no more than demonstrating, that this or that action tends to man's real happiness, and therefore very justly concluding that the performance of it is a part of the law of nature; or, on the other hand, that this or that action is destructive of man's real happiness, and therefore that the law of nature forbids it.

This law of nature, being coeval with mankind and dictated by God himself, is of course superior in obligation to any other. It is binding over all the globe in all countries, and at all times: no human laws are of any validity, if contrary to this; and such of them as are valid derive all their force, and all their authority, mediately or immediately, from this original.

But in order to apply this to the particular exigencies of each individual, it is still necessary to have recourse to reason: whose office it is to discover, as was before observed, what the law of nature directs in every circumstance of life; by considering, what method will tend the most effectually to our own substantial happiness. And if our reason were always, as in our first ancestor before his transgression, clear and perfect, unruled by passions, unclouded by prejudice, unimpaired by disease or intemperance, the task would be pleasant and easy; we should need no other guide but this. But every man now finds the contrary in his own experience; that his reason is corrupt, and his understanding full of ignorance and error.

This has given manifold occasion for the benign interposi-

tion of divine providence; which, in compassion to the frailty, the imperfection, and the blindness of human reason, hath been pleased, at sundry times and in divers manners, to discover and enforce its laws by an immediate and direct revelation. The doctrines thus delivered we call the revealed or divine law, and they are to be found only in the holy scriptures. These precepts, when revealed, are found upon comparison to be really a part of the original law of nature, as they tend in all their consequences to man's felicity. But we are not from thence to conclude that the knowledge of these truths was attainable by reason, in its present corrupted state; since we find that, until they were revealed, they were hid from the wisdom of ages. As then the moral precepts of this law are indeed of the same original with those of the law of nature, so their intrinsic obligation is of equal strength and perpetuity. Yet undoubtedly the revealed law is of infinitely more authenticity than that moral system, which is framed by ethical writers, and denominated the natural law. Because one is the law of nature, expressly declared so to be by God himself; the other is only what, by the assistance of human reason, we imagine to be that law. If we could be as certain of the latter as we are of the former, both would have an equal authority; but, till then, they can never be put in any competition together.

Upon these two foundations, the law of nature and the law of revelation, depend all human laws; that is to say, no human laws should be suffered to contradict these. There are, it is true, a great number of indifferent points, in which both the divine law and the natural leave a man at his own liberty; but which are found necessary for the benefit of society to be restrained within certain limits. And herein it is that human laws have their greatest force and efficacy: for, with regard to such points as are not indifferent, human laws are only declaratory of, and act in subordination to, the former. To instance in the case of murder: this is expressly forbidden by the divine, and demonstrably by the natural law; and from these prohibitions arises the true unlawfulness of this crime. Those human laws that annex a punishment to it, do not at all increase its moral guilt, or superadd any fresh obligation in *foro conscientie* to abstain from its perpetration. Nay, if any human law should allow or injoin us to commit it, we are bound to transgress that human law, or else we must offend both the natural and the divine. But with regard to matters that are in themselves indifferent, and are not commanded or forbidden by those superior laws; such, for instance, as exporting of wool into foreign countries; here the inferior legislature has scope and opportunity to interpose, and to make that action unlawful which before was not so.

We might further add, that, as there is a natural and necessary difference between virtue and vice, and the several actions and dispositions which are denoted by these two opposite terms, natural reason discovers it to be the will of God, that every man should look upon this difference in the nature of things and actions, as a law or rule, which he is religiously to observe, under pain of his Maker's displeasure. Among those writers who have alleged arguments in proof of the law of nature, some have founded it upon the reason and fitness of things, others, on our moral sense, and social affections; and others, again, on the good effects of virtue, and evil effects and consequences of vice; but, however they may differ in the principles upon which they have founded their reasoning, they have ultimately arrived at the same conclusion. These principles are illustrated under their proper heads in the course of this work. The names and works of the different writers are cited by Grove,

in his "System of Moral Philosophy," vol. II. p. ii. n. 5. The law of nature, says the author last cited, is eternal and necessary; so that it always did, and always could not but exist. It is universal, inasmuch that all mankind are born the subjects and objects of this law, notwithstanding the difference of climate, of government, of language, and of opinions and customs that have prevailed in different parts of the world. Moreover, the law of nature is immutable, for the divine nature is immutable. The first principle, or law of nature, according to Hobbes, is self-preservation. Thomasius will have in to be our own happiness, which falls in at last with the sentiment of Hobbes. Puffendorf maintains it to be sociality. Valentine Alberti, the belief that we are the image of God. Henry and Samuel Cocceius, the will of God. Grotius, right reason. Velthemius, the intrinsic decency or turpitude of actions. Strimefus and Janus, that we are to love God, ourselves, and our neighbour.

Laws, *Human*, comprehend all those rules of conduct, which originate in the wisdom of man, individually or collectively considered, and which are designed to regulate their behaviour to one another in more limited or more enlarged societies, and which are enforced by human authority and worldly sanctions. Human laws are necessary as a remedy, partly to the generality, and partly to the inefficacy of the divine. The laws of God are too general to ascertain all the duties of society, without some additional interpretations of men. That no man by fraud or violence injure another, and take his property, is a divine law; which notwithstanding, human laws are in many cases needful to settle the bounds of property, and assign every member of the community his rights and duties; what he may expect from others, and what he is to do to them. "Salus populi suprema lex esto." "To secure the welfare of the society be the supreme law" is really a divine precept; but the geniuses and interests of nations are so various, yea, so liable to change are the interests and circumstances of the same people, that different laws are necessary to suit this diversity of tempers, occasions, and emergencies. Nor is it any reproach to the divine law that it is no more particular; since it must be infinite to reach all the particular circumstances of mankind: and God hath given men reason, by which they may build upon the foundation that he hath laid such further laws and constitutions, as the course and posture of human affairs shall require. Nor is the inefficacy of the law of God, which is the other thing that makes human laws necessary, any more a dishonour to it. For what is the cause of this inefficacy, but the wilful corruption of men? It was most fit, that the chief rewards and punishments annexed to the divine laws should be unseen and future; that the trial of human virtue might be more conspicuous. And were not mankind sunk into an extreme degeneracy, the prospect of an eternal world would make all other considerations useless. But as it is now, the torments of an after-life are not a bridle strong enough upon the lusts and passions of men. It is therefore necessary, that every society, to secure its own peace, should insert as much of the divine law into their respective constitutions, as concerns the welfare of the body politic; and enforce these laws, not as divine, but as laws of the state, with civil sanctions; that they who will not be made honest by the fear of God, may be so by the fear of the laws of their country. The difference between the philosophers and others was said to be this, *Μορὸν ποιεῖσθαι ἐκείνων ἀ πρᾶξι ἀκούειν αἱ δικασαί*, "that they praised from choice that honesty and virtue, which others observed through fear of the laws;" agreeably to that of the apostle, "that the law is not made for a righteous man, but for the lawless and

disobedient." All human laws are of the nature of those called *civil*; and these, with regard to the difference of their subject matter, may be sub-divided into the law of nations, civil law, and canon law.

*Law of Nations, Jus Gentium*, is that rule, or measure, which all or several nations, either by a tacit or express agreement, are obliged to observe towards one another, whether in peace or war. If, indeed, men were to live in a state of nature, unconnected with other individuals, there would be no occasion for any other laws, than the law of nature, and the law of God. Neither could any other law possibly exist: for a law always supposes some superior who is to make it; and in a state of nature we are all equal, without any other superior but him who is the author of our being. But man was formed for society; and, as is demonstrated by the writers on this subject, is neither capable of living alone, nor indeed has the courage to do it. However, as it is impossible for the whole race of mankind to be united in one great society, they must necessarily divide into many; and form separate states, commonwealths, and nations, entirely independent of each other, and yet liable to a mutual intercourse. Hence arises a third kind of law, to regulate this mutual intercourse, called "the law of nations:" which, as none of these states will acknowledge a superiority in the other, cannot be dictated by any; but depends entirely upon the rules of natural law, or upon mutual compacts, treaties, leagues, and agreements between these several communities: in the construction also of which compacts we have no other rule to resort to, but the law of nature; being the only one to which all the communities are equally subject: and therefore the civil law very justly observes, that "quod naturalis ratio inter omnes homines constituit, vocatur jus gentium."

*Law, Civil or Municipal*, is the rule by which particular districts, communities, or nations are governed; being thus defined by Justinian, (Inst. 1. 2. 1.) "Jus civile est quod quisque sibi populus constituit." Judge Blackstone calls it "municipal" law, in compliance with common speech; for though, strictly speaking, that expression denotes the particular customs of one single *municipium*, or free town, yet it may with sufficient propriety be applied to any one state or nation, which is governed by the same laws and customs. Accordingly, municipal law, thus understood, is properly defined to be "a rule of conduct prescribed by the supreme power in a state, commanding what is right and prohibiting what is wrong." It is a "rule;" not a transient order from a superior to or concerning a particular person, but something permanent, uniform, and universal. It is thus distinguished from advice or counsel, and also from a compact or agreement. (See the beginning of the article *LAW*.) It is a rule of "civil conduct," by which it is distinguished from the natural or revealed law. (See *LAW of Nature*.) The municipal or civil law regards man as a citizen, and bound to other duties towards his neighbour than those of mere nature and religion; duties in which he has engaged, in consequence of enjoying the benefits of the common union; and which amount to no more than that he do contribute, on his part, to the subsistence and peace of the society. It is likewise a rule "prescribed," because a bare resolution, confined in the breast of the legislator, without manifesting itself by some external sign, can never be properly a law. This resolution must be notified to the people who are to obey it. This may be done by universal tradition and long practice, which suppose a previous publication, and is the case of the common law of England. It may be notified, *visa voce*, by officers appointed for that purpose, as is done with regard to proclamations, and such acts of parliament

parliament as are appointed to be publicly read in churches and other assemblies. And, lastly, it may be notified by writing, printing, or the like; which is the general course taken with all our acts of parliament. This notification, however, should be made in the most public and perspicuous manner; and not like the mask of Calgula, who (according to Dion Cassius) wrote his laws in a very small character, and hung them up upon high pillars, the more effectually to enslave the people. That, without doubt, can never be a rule to any person, which is not liable to his cognizance, or which he neither does nor can know. Agreeably to this circumstance, some have derived "lex" a *legendo*; because the law was to be publicly read, that it might be known to all and observed by all. The matter of *divine* laws being usually of great importance, and the author a sovereign who has an absolute propriety in us, and on that ground an unquestionable right to the most entire devotedness, and zealous concern to please him; we ought to use all the means in our power to come at the knowledge of his will. But as *human* laws proceed from the will of those who, by nature, are upon a level with the rest of mankind, and have the consent of others to govern them purely for their temporal or political good; such a provision ought to be made for their publication, that by an ordinary care, and without taking up much of their time and thoughts, which are to be spent in their private callings, people may be able to know the pleasure of their governors. There is another circumstance, which is worse than the non-promulgation of a law; and that is the making of laws "ex post facto:" when after an action (indifferent in itself) is committed, the legislator then for the first time declares it to have been a crime, and inflicts a punishment upon the person who has committed it. All laws should be made to commence "in futuro," and be notified before their commencement. When the laws or rules of conduct are properly notified or prescribed, it is the business of the subject to be thoroughly acquainted with them: for if ignorance, of what he might know, were admitted as a legitimate excuse, the laws would be of no effect, but might always be eluded with impunity. On this head we shall only add, that it is requisite to the very essence of a law, that it be made by the supreme power. Sovereignty and legislature are convertible terms; one cannot subsist without the other. That the law may answer the purpose of a complete rule, "commanding what is right and prohibiting what is wrong," it is necessary that the boundaries of right and wrong be established and ascertained by law: and it is then the business of the law, considered as a rule of civil conduct, to enforce these rights, and to redress these wrongs. For this purpose every law may be said to consist of several parts: one, *declaratory*, whereby the rights to be observed, and the wrongs to be eschewed, are clearly defined and laid down; another, *directory*, whereby the subject is instructed and enjoined to observe those rights, and to abstain from the commission of those wrongs; a third, *remedial*, whereby a method is pointed out to recover a man's private rights; or redress his private wrongs; to which may be added a fourth, usually termed the *sanction*, or *vindictory* branch of the law, whereby it is signified what evil or penalty shall be incurred by such as commit any public wrongs, and transgress or neglect their duty. (Blackst. Com. book i.) For the interpretation of the law, see INTERPRETATION.

*Civil* laws, considered with regard to the two offices of the legislator, viz. to judge and to compel, may be divided into two branches; the one *distributive*, the other *vindictive* and *penal*.

**LAW, Distributive**, is that by which every man has his

right; or, it is that which constitutes the rules and measures of things, whereby we know what belongs to us, and what to others; so as we may not disturb or interrupt others in the enjoyment of their own, nor be interrupted by them; and what each man may lawfully do or not do.

**LAW, Vindictive**, is that branch by which the punishments to be inflicted on those who violate the laws, are determined.

The distributive and vindictive are not two species of laws, but two parts of the same law. For if a law say no more than "Whatever you catch in your net, in the sea, shall be your's," it is in vain; for though another take from you what you have caught, it is still your's; in regard, in the state of nature, where all things are common, your's and another's are the same thing. So that what the law defines to be your's, was your's before that law, and will be your's after it, though possessed by another.—A law, therefore, is but an empty sound, unless it determine the thing to be your's in such a sense as to forbid every body else from disturbing you in the possession of it. But such prohibition will be vain, unless there be a penalty annexed to it. A law, therefore, must contain both these parts, that which prohibits, and that which punishes. The first whereof, which is called *distributive*, is prohibitory, and speaks to all; the latter, called *vindictive* or *penal*, is mandatory, and speaks only to the public officers. Whence it follows, that to all civil laws there is annexed a penalty, either implicitly or explicitly; and where that punishment is not ascertained, either by writing or by example, it is supposed to be arbitrary, and to depend on the pleasure of the legislator: for that is no law, which may be violated impune.

*Civil* laws, considered with regard to the different manners of promulgating them, are of two kinds; *scripta* and *non scripta*, or *written* and *unwritten*.

**Laws, Written**, are those which require either the voice, or some other sign of the legislator's will to become laws. The written laws of England consist of statutes, acts, or edicts, made by the king's majesty, by and with the advice and consent of the lords spiritual and temporal, and commons, in parliament assembled. The oldest of these now extant is the famous "magna charta," as contained in parliament 9 Hen. III. See **MAGNA CHARTA** and **STATUTES**.

**Laws, Unwritten**, are such as need no other promulgation besides the voice of nature, or natural reason; of which kind are all natural laws.

Hence it appears, that though the natural laws be described in the writings of the philosophers, they are not therefore to be called *written* laws; nor are the writings of lawyers, laws, for want of the supreme authority; nor the *responsa prudentum*, or opinions of judges, laws, excepting so far as they are allowed by the supreme power to pass into use; and then they are called *leges scripta*, written laws; not because of their use, but because of the will of the supreme power, which is argued from their passing into use.

The unwritten law of England includes not only "general customs," as the *common laws*, properly so called; but also the "particular customs" of certain parts of the kingdom; and likewise those "particular laws," that are by *custom* observed only in certain courts and jurisdictions. When these parts of the municipal law of England are called "leges non scripta," we are not to understand that these laws are at present merely *oral*, or communicated from the former ages to the present solely by word of mouth. Indeed, during an age of profound ignorance of letters, all laws were entirely traditional, because the nations among which they prevailed had but little idea of writing. Thus the British

as well as the Gallic Druids committed all their laws, as well as learning, to memory; and it is said of the primitive Saxons here, as well as their brethren on the continent, that "leges sola memoria et usu retinebant." But with us, at present, the monuments and evidences of our legal customs are contained in the records of the several courts of justice, in books of reports and judicial decisions, and in the treatises of the learned sages of the profession, preserved and handed down to us from the times of highest antiquity. But these parts of our law may be fitly styled "leges non scriptæ," because their original institution and authority are not set down in writing, as acts of parliament are, but they receive their binding power, and the force of laws, by long and immemorial usage, and by their universal reception throughout the kingdom. In like manner as Aulus Gellius defines the "jus non scriptum" to be that, which is "tacito et illiterato hominum consensu et moribus expressum." See *COMMON LAW* and *CUSTOM*.

Having considered the *civil* law in its more general acceptance, as denoting the statutes and ordinances of every state for its own good government, we shall refer for the statement of its more special acceptance to the article *CIVIL LAW*.

*LAWS*, *Canon* or *Ecclesiastical*, in a more extensive sense, denote laws relating to the worship, discipline, and government of the church. For an account of that which is by way of eminence called *canon law*, see *CANON LAW*.

There is another division of the law of England besides that which we have above stated, more large and particular; as into the prerogative or crown law; the law and custom of parliament; the common law; the statute law; reasonable customs; the law of arms, war, and chivalry; ecclesiastical or canon law; civil law, in certain courts and cases; forest law; the law of marque and reprisal; the law of merchants; the law and privilege of the stannaries, &c. But this large division may be reduced to the common division; and all is founded on the law of nature or reason, and the revealed law of God, as all other laws ought to be. 1 Co. Inst. 11.

Law is also applied to the several policies of states and people, or the maxims and rules they have agreed upon, or received from their magistrates, whereby to live in peace and mutual society.

The laws of the twelve tables were the ancient laws of the Romans, for which the Decemviri were sent into Greece, and which served them for the ground-work of all their jurisprudence.

The celebrated laws of the more modern days, are those of the Angli, the Werini, or Thuringi; of the Boii, or Bavarians; those of the Burgundi, Germans, Danes, and Norwegians; of the Franks, the Frisians, the Lombards, the Gothic law, the Martina, or Merician law; of the laws of the Saxons, Scots, Sicilians, Visigoths; the laws of Oleron, the Moimatin law, and the Salic law.

*LAW*, *Lex*, among the first Romans properly signified an ordinance of the people, made at the request of a magistrate, particularly a consul.

These ordinances differed from the plebiscita and senatus consulta, and even from other ordinances made at the request of any other magistrate beside a consul, though those too bore the name of laws.

Thus, though Aquilius and Falcidius were only tribunes when they made their request, yet we still say, the *Aquilian* law, the *Falcidian* law, &c.

The several laws of the Romans are distinguished, 1. By the name of him at whose request they were passed; as the *Cornelian* law, the *Julian* law, &c. 2. By the matter or

subject of the law; and hence came the terms, *testamentary* laws, as the *Furian*, *Voconian*, &c. *judiciary* laws, *Agrarian* laws, &c.

3. Sometimes by the crimes against which they were made. For instance: the laws touching *poisoning*, *parricides*, &c. the laws of *concession*, *peculate*, &c.

The *Codex* and *Authentica* are the laws and constitutions of the Roman emperors; and the *Digest* is a compilation, made by the emperor Justinian's order, of the several opinions and judgments of the most learned in the Roman law; to which he gave the sanction of laws, as appears by the epistle prefixed to the work; and it is this that properly constitutes the Roman law. See *CIVIL LAW*.

The *lex talionis*, or *law of like for like*, is the most ancient and equitable law in the world. It was observed by the Hebrews.

*LAW* has also a more special signification, wherein it is taken for that which is lawful with us, and not elsewhere: as "tenant, by the courtesy of England."

Thus we also say, to *swage law* (*swadare legem*), and to *make or do law* (*facere legem*). See *WAGER*, and *MAKE*.

*LAW of Arms*, is that law which gives precept how rightly to proclaim war, to make and observe leagues, to attack the enemy, and to punish offenders in the camp.

Common things concerning arms and war are under the cognizance of the constable and marshal of England. 13 R. II.

*LAW*, *Assignee* by. See *ASSIGNEE*.

*LAW*, *Covenant* of. See *COVENANT*.

*LAWS of Estates*, such acts and regulations as relate to their natures and managements. See *ESTATE*, and *FARM*.

*LAW*, *Forest*. See *FOREST*.

*LAW*, *Frank*. See *FRANK*.

*LAW of Honour*, denotes a system of rules, constructed by people of fashion, and calculated to facilitate their intercourse with one another; and for no other purpose. Nothing is adverted to by the law of honour but what tends to incommode this intercourse; and hence it only prescribes and regulates the duties betwixt equals, omitting such as relate to the Supreme Being, as well as those which we owe to our inferiors. For which reason, profaneness, neglect of public worship or private devotion, cruelty to servants, rigorous treatment of tenants or other dependants, want of charity to the poor, injuries done to tradesmen by insolvency or delay of payment, with numberless examples of the same kind, are accounted no breaches of honour; because a man is not a less agreeable companion for these vices, nor the worse a deal with, in those concerns which are usually transacted between one gentleman and another. Again, the law of honour, being constituted by men occupied in the pursuit of pleasure, and for the mutual conveniency of such men, will be found, as might be expected from the character and design of the law-makers, to be, in most instances, favourable to the licentious indulgence of the natural passions. Thus it allows of fornication, adultery, drunkenness, prodigality, duelling, and of revenge in the extreme; and lays no stress upon the virtues opposite to these. *Paley's Principles of Moral and Political Philosophy*, vol. i.

*LAW*, *Insurance* of. See *INSURANCE*.

*LAW*, *Intendment* of. See *INTENDMENT*.

*LAW Language* was formerly, in this kingdom, Norman or law French; and in this barbarous dialect were all public proceedings written and recorded. Nothing could be a more humiliating and ignominious badge of tyranny and foreign servitude; being introduced under the auspices of William the Norman, and his sons; and thus the ironical observation of the Roman satirist came to be literally verified, that

"Gallia

“*Gallia caudicos docuit facunda Britannos.*” (Juvén. xv. 111.) This continued till the reign of Edward III., when by stat. 36 Ed. III. c. 15, it was enacted, that for the future all pleas, &c. should be conducted in the English tongue; but entered and enrolled in Latin. The practitioners, however, being used to the Norman language, which was more familiar to them, continued to take their notes in law French; and when these notes were published, under the denomination of reports, they were printed in that barbarous dialect; which, joined to the additional terror of a Gothic black letter, has occasioned many students to throw away their Plowden and Littleton, without venturing to attack a page of them. But in reality, says Blackstone, on a nearer acquaintance, they would have found nothing formidable in the language; which differs in its grammar and orthography as much from the modern French, as the diction of Chaucer and Gower does from that of Addison and Pope. Besides, as the English and Norman languages were concurrently used by our ancestors for several centuries, the two idioms have naturally assimilated, and actually borrowed from each other; for which reason the grammatical construction of each is so very much the same, that an Englishman (with a week’s preparation) would understand the laws of Normandy, collected in their “grand coutumier,” as well, if not better, than a Frenchman bred within the walls of Paris.

The Latin, which succeeded the French for the entry and enrolment of pleas, and which continued in use for four centuries, answers so nearly to the English, that it has been generally imagined to be totally fabricated at home, with little more art or trouble than by adding Roman terminations to English words. Whereas, in reality, it is a very universal dialect spread throughout all Europe at the irruption of the northern nations, and particularly accommodated and moulded to answer all the purposes of the lawyers with a peculiar exactness and precision. These northern nations, or rather their legislators, though they resolved to promulge their laws in the Latin tongue, have frequently intermixed in it some words of a Gothic original; which is more or less the case in every country of Europe, and ought not, therefore, to be imputed as any peculiar blemish in our English legal Latinity. The truth is, that which is generally denominated law Latin, is in reality a mere technical language, calculated for eternal duration, and easy to be comprehended both in present and future times; and on those accounts best suited to preserve those memorials which are intended for perpetual rules of action. As to the objection of locking up the law in a strange and unknown tongue, this is of little weight with regard to records, which few have occasion to read, but such as do, or ought to, understand the rudiments of Latin. The learned Blackstone suggests, that the terms of the “law are not more numerous, more uncouth, or more difficult to be explained by a teacher, than those of logic, physics, and the whole circle of Aristotle’s philosophy, nay even of the politer arts of architecture and its kindred studies, or the science of rhetoric itself.” The technical Latin continued in use from the time of its first introduction till the time of the subversion of our ancient constitution under Cromwell, when, among many other innovations in the law, the language of our records was altered and turned into English. But, at the restoration of king Charles, this novelty was no longer continued; the practitioners finding it very difficult to express themselves so concisely or significantly in any other language but the Latin. Thus it continued without any sensible inconvenience till about the year 1730, when it was again thought proper that the proceedings at law should be done into English; and it was accordingly so ordered

by statute 4 Geo. II. c. 26. This provision was made, according to the preamble of the statute, that the common people might know and understand what was alleged or done for and against them, in the process and pleadings, the judgment and entries in a cause. Several inconveniences arose from this alteration; so that in two years it was found necessary to make a new act, 6 Geo. II. c. 14, which allows all technical words to continue in the usual language, and has thereby almost defeated every beneficial purpose of the former statute. Blackst. Com. b. iii.

LAW, *Marine*, denotes that law which serves to regulate the interests of navigation and maritime commerce. (See NAVIGATION, and COMMERCE.) This law has undergone various alterations and improvements, in consequence of the extension of naval intercourse between different nations for the purposes of commerce. Several codes have been formed by different states primarily for the regulations of navigation, and for defining the authority of the masters and other officers of ships, and the duty and rights of the seamen; and afterwards for the regulation of maritime contracts. The earliest system of marine law, which history records, was that compiled by the Rhodians, after they had, by their commerce and naval victories, obtained the sovereignty of the sea, about 900 years before the Christian era. These laws exist at present only in a detached and imperfect state, as they have been preserved and incorporated in other subsequent institutions of a similar nature. It has been supposed by some that the Rhodian laws were adopted by the Romans during the first Punic war, when they first became a naval power; but others affirm that they were incorporated with the Roman law by Justinian and others. As for the Phœnicians, Carthaginians, Athenians, Corinthians, and other maritime states of antiquity, it does not appear whether they had any marine laws of their own institution. If they had any, they have not been transmitted to our times. The first code of modern sea-laws was compiled, says Serjeant Marshall, about the time of the first crusade, towards the end of the 11th century, by the people of Amalfi, who had then become considerable for their commerce and maritime power. It is not improbable that the code consisted principally of the Rhodian institutions, which were found still in force in the countries bordering upon the Mediterranean; and being collected into one regular system, were generally received, for a considerable time, as law in those countries. In process of time, other states, as they acquired importance and distinction, formed new collections of marine laws, in which the old institutions were altered and modified to suit the improvements of the times, or their own particular interest. But when inconveniences were found to arise from a diversity of rules pertaining to a subject that had been long regulated by one general system, it became necessary for the different maritime states to form a new code out of all these discordant materials, which was done, as Grotius informs us, (De Jure Bell. l. iii. c. 1. § 5. n. 6.), by the authority of almost all the sovereigns of Europe. This new digest was denominated “*Consolato del Mare.*” It was first published, by order of the ancient kings of Aragon, in the Catalan tongue, and therefore probably composed at Barcelona, the capital of Aragon. In the 13th century this code was revived as law in Italy, the Greek empire, France, and Germany; and Vinnius says, that most of the marine laws in Spain, Italy, France, and England are borrowed from it. It seems to have been considered as a branch of the public law, and its regulations are still of very high authority in every maritime state of Europe. The next collection of sea-laws in point of time, as well as of celebrity, is that of Oleron,

Oleron. (See OLERON.) This was succeeded by a collection of the ordinances made by the "Merchants and masters of the magnificent city of Wisbuy, in the island of Gothland, formerly very famous for its commerce, but now reduced to an obscure and inconsiderable town." Many of the regulations contained in this code of laws are precisely the same with those of Oleron. These laws were for some ages, and indeed still remain, in great authority in the northern parts of Europe. In 1507, the deputies of the Hanseatic league, in a general assembly at Lubeck, drew up a system of laws relating to navigation, for the use of their confederacy, to which, in 1614, they added several new ordinances. But the most complete and comprehensive system of this kind is the famous ordinance of the marine of Louis XIV. published in 1681. This excellent code was compiled and arranged by a very masterly hand, under the inspection of Colbert, the celebrated minister of that prince, upon an attentive revision of all the ancient sea-laws of France and other countries, with the assistance of the most learned men of the time, and upon consultation with the different parliaments, the courts of admiralty, and the chambers of commerce in France. It forms a system of whatever experience and the wisdom of ages had pronounced to be most just and convenient in the marine institutions of the maritime states of Europe. Notwithstanding new regulations, suggested by motives of national interest, it has hitherto been esteemed a code of great authority upon all questions of maritime law. From this ordinance, and from the elaborate and useful commentary of Valin, Lord Mansfield is said to have derived much of his extensive and accurate acquaintance with the principles of marine. Marshall's Law of Insurance, vol. 1. See INSURANCE.

**LAW of Marque**, a law by which those who are driven to make use of it, take the goods, or shipping of the party that has done them wrong, and of whom they cannot get ordinary justice, whenever they can take him within their own bounds or precincts. 27 Edw. III. cap. 17.

**LAW, Martial**. See MARTIAL.

**LAW Merchant**, a summary sort of law, originally differing from the common law, though now adopted, and become a part of the laws of the kingdom. This decides the causes of merchants on the general rules which obtain in all commercial countries; and that often, in matters relating to domestic trade, as, for instance, with regard to the drawing, the acceptance, and the transfer, of inland bills of exchange. (Co. Litt. 172. Lord Raym. 181. 1562.) One point of it consists in this, that if there be two joint merchants of wares, and one of them dies, his executor shall have the moiety; which is not allowed in the case of others, not merchants. See CUSTOM.

The law of merchants not being founded in the particular institutions, or local customs of any particular country, but consisting of certain principles which general convenience has established to regulate the dealings of merchants with each other in all countries, may be considered as a branch of public law.

**LAWs of Molmutius**. See MOLMUTIN *Laws*.

**LAWs of Oleron**. See OLERON.

**LAW of Parliament**. See PARLIAMENT.

**LAW, Poyning's**. See POYNING.

**LAW, Release in**. See RELEASE.

**LAW, Salic**. See SALIC.

**LAW, Spiritual**, is the ecclesiastical or canon law, allowed and authorized in this realm, so far as it is not against the common law, nor against the statutes and customs of the kingdom. And according to such ecclesiastical laws, the

ordinary and other ecclesiastical judges proceed in cases within their cognizance.

**LAW Staple**, the same with law merchant.

**LAW Suit**. See SUIT.

**LAW, Sumptuary**. See SUMPTUARY.

**LAW, Surrender in**. See SURRENDER.

**LAWs, By**. See BY-LAWS.

**LAWs, Cock-pit**. See COCKPIT.

**LAWs of the Stage**. See STAGE.

**LAW** is also used figuratively in speaking of the rules or order wherein any thing is performed.

Thus we say, the laws of motion, the laws of mechanics, the laws of fluids, the laws of chance, of a game, &c. laws of friction, of resistance, of descent of bodies, &c. laws of elasticity, rarefaction, reflexion, refraction, &c.; all which see under their proper heads.

**LAW**, in *Scripture History*, one of the three divisions of the Old Testament, comprehending Genesis, Exodus, Leviticus, Numbers, Deuteronomy. See CANON.

**LAW-Day, Lagedayum**, in our old *Law Writers*, was any day of open court, and commonly used for the courts of a county or hundred. It is also called *view of Frank-pledge, or court-leet*. "Et quieti sint de festis comitatum & hundredorum nostrorum, de visu franci plegii & laudavorum, &c."

**LAWA**, in *Geography*, a town of the island of Bornoeo, situated on a river of the same name. N. lat. 0° 40'. E. long. 110° 42'.

**LAWEND**, in the military language of the Ottoman empire, the appellation of cavalry, called also *Delibaches*. (See *DELIBACHES*.) From *Lawend* we have formed *Laventi*. Their arms are short sabres, pistols, muskets, and lances. They wear a kind of cap, which is a long cylinder of black felt, nine or ten inches high, and without any projecting rim. Their saddles are made in the English manner, of a single skin, stretched upon a wooden tree; in the rest of their accoutrements and clothing, they resemble the Mamlouks. Their ragged clothes, their rusty arms, and their horses of different sizes, give them the appearance of banditti more than of soldiers; and, in reality, they have first distinguished themselves under the former character, nor have they much changed their habits by adopting their second occupation. Almost all the cavalry in Syria are Turkmans, Curds, or Caramanians; who, after exercising the trade of robbers in their own country, seek employment, as well as an asylum, near the person of the pacha. Throughout the empire, their troops are, in like manner, formed of plunderers, who roam from place to place. From want of discipline, they retain their former manners, and are the scourge of the country, which they lay waste, and of the peasants, whom they often pillage by open force. Volney's Travels, vol. ii.

**LAWER KIRK**, in *Geography*, a town of Scotland, in the county of Perth; 15 miles S.E. of George Town.

**LAWES, WILLIAM**, in *Biography*, the eldest son of Thomas Lawes, a vicar-choral of the cathedral church of Salisbury, and a native of that city, was placed early in life under Copernario, for his musical education, at the expense of the earl of Hertford. His first preferment was in the choir of Chichester, but he was soon called to London, where, in 1602, he was sworn a gentleman of the chapel royal; which place, however, he resigned in 1611, and became one of the private, or chamber-musicians, to Charles, then prince, and afterwards king. Fuller says, "he was respected and beloved of all such persons as cast any looks towards virtue and honour;" and he seems well entitled to this praise. He manifested his gratitude and loyalty to his royal master by taking up arms in his cause against the parliament.

liament. And though, to exempt him from danger, lord Gerrard, the king's general, made him a commissary in the royal army, yet the activity of his spirit disdaining this intended security, at the siege of Chester, 1645, he lost his life by an accidental shot. The king is said, by Fuller, to have been so affected at his loss, that though he was already in mourning for his kinsman lord Bernard Stuart, killed at the same siege, his majesty put "on particular mourning for his dear servant William Lawes, whom he commonly called the father of music."

His chief compositions were fantasias for viols, and songs and symphonies for masques. Though his brother Henry, in the preface to the Choice Psalmes for three voices, which they published jointly, boasts that "he composed more than thirty several sorts of music for voices and instruments, and that there was not any instrument in use in his time but he composed for it as aptly as if he had only studied that." In Dr. Aldrich's Collection, Christ-church, Oxon, there is a work of his called Mr. William Lawes's Great Consort, "wherein are six fettes of musicke, six books." His Royal Consort for two treble viols, two viol da gambas, and a thorough-bass, which was always mentioned with reverence by his admirers in the 17th century, is one of the most dry, awkward, and unmeaning compositions we ever remember to have had the trouble of scoring. It must, however, have been produced early in his life, as there are no bars, and the passages are chiefly such as were used in queen Elizabeth's time. In the music-school at Oxford are two large manuscript volumes of his works in score, for various instruments; one of which includes his original compositions for masques, performed before the king, and at the inns of court.

His anthem for four voices, in Dr. Boyce's second volume, is the best and most solid composition that we have seen of this author; though it is thin and confused in many places, with little melody, and a harmony in the chorus, p. 201, which we are as unable to understand, or reconcile to rule, or to our own ears. He must have been considerably older than his brother Henry, though they frequently composed in conjunction. We are, however, unable to clear up this point of primogeniture: Henry's name is placed first in the title to Choice Psalmes, published in 1648, in the preface to which he says, "as to that, which is my part in this composition, it takes precedence of order only, not of worth." And yet he says of his own tunes just before, "they had their birth at the same time as his." Besides the psalms at the end of sir William Davenant's masque, called "The Triumphs of the Prince d'Amour," 1635, it is said, that "the musick of the songs and symphonies were excellently composed by Mr. William and Mr. Henry Lawes, his majesty's servants."

Several of the songs of William Lawes occur in the collections of the time, particularly in John Playford's Musical Companion, part the second, consisting of dialogues, glees, ballads, and airs, the words of which are in general coarse and licentious. The dialogue part, which he furnished to this book, is a species of recitative, wholly without accompaniment: and the duet at last, which is called a chorus, is insipid in melody, and ordinary in counterpoint. His boated canons, published by his brother Henry at the end of their psalms, as proofs of his great abilities in harmony, when scored, appear so far from finished compositions, that there is not one of them totally free from objections, or that bears the stamp of a great master.

LAWES, HENRY, the brother of William, was likewise a disciple of Coperario. By the cheque-book of the chapel royal, it appears that he was sworn in Pisteller, in January, 1625, and, in November following, gentleman of the chapel;

after this, he was appointed clerk of the cheque, and one of the public and private musicians to Charles I. William and Henry Lawes were at this time in such general favour, that though the kingdom was divided into factions, and were not only varied more in their principles, but disputed them with more violence than at any other period of our history, there was but one opinion concerning the abilities of these musicians. Yet as the reputation of Henry was still higher, and more firmly established than that of his brother, it seems to require more ample discussion. We have examined with care and candour all the works which we could find of this composer, which are still very numerous, and are obliged to own ourselves unable, by their excellence, to account for the great reputation which he acquired, and the numerous panegyrics bestowed on him by the greatest poets and musicians of his time. His temper and conversation must certainly have endeared him to his acquaintance, and rendered them partial to his productions; and the praise of such writers as Milton and Waller is durable fame. Tallis, Bird, or Gibbons, who were all infinitely superior to Lawes, never had their abilities blazoned by contemporary poets or historians of eminence. Fenton, the editor of Waller's works, tells us, that "the best poets of his time were ambitious of having their verses set to music by this admirable artist;" and, indeed, he not only set some of the works of almost every poet of eminence in Charles I.'s reign, but of young noblemen and gentlemen who seem only to have tried their strength on the lyre for his use, and of whose talents for poetry no other evidence remains than what is to be found in Lawes's publications.

Waller has more than once bestowed his fragrant incense on this musician. Peck says, that "Milton wrote his Masque at the request of Lawes;" but whether Milton chose Lawes, or Lawes Milton for a colleague in Comus, it equally manifests the high rank in which he stood with the greatest poets of his time. It would be illiberal to cherish such an idea; but it does sometimes seem as if the twin-sisters, Poetry and Music, were mutually jealous of each other's glory: "the less interesting my liter's offspring may be," says Poetry, "the more admiration will my own obtain." Upon asking some years ago, why a certain great prince continued to honour with such peculiar marks of favour an old performer on the flute, when he had so many musicians of superior abilities about him? We were answered, "because he plays worse than himself." And who knows whether Milton and Waller were not secretly influenced by some such consideration? and were not more pleased with Lawes for not pretending to embellish or enforce the sentiments of their songs, but setting them to sounds less captivating than the sense.

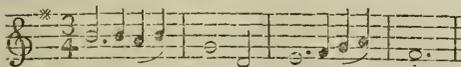
But bad as the music of Lawes appears to us, it seems to have been sincerely admired by his contemporaries in general. It is not meant to insinuate that it was pleasing to poets only, but that it was more praised by them than any other music of the same time. Though that of Lanier, Hilton, Simon Ives, Dr. Child, and others, seems preferable; and the poets, whose praise is fame, perhaps taught others to admire.

The time was now come for simplifying harmony and purifying melody in England, as well as in Italy; and the beginning of this enterprize was not fortunate here any more than in that country: harmony and contrivance were relinquished without a compensation. Simplicity, indeed, was attained; but devoid of accent, grace, or invention. And this accounts for the superiority of church music over secular at this period in every part of Europe, where canon, fugue, rich harmony, and contrivance, were still cultivated; while the first attempts at air and recitative were awkward, and the bases thin and unmeaning. Indeed, the composers of this kind

kind of music had the single merit to boast of affording the singer an opportunity of letting the words be perfectly well understood; as their melodies, in general, consisted of no more notes than syllables, while the treble accompaniment, if it subsided, being in unison with the voice-part, could occasion no embarrassment or confusion.

But there seems as little reason for sacrificing music to poetry, as poetry to music; and when the sentiments of the poem are neither enforced nor embellished by the melody, it seems as if the words might be still better articulated and understood by being read or declaimed, than when drawn out in such psalmodic ayres as those of Henry Lawes and his contemporaries. It has, however, been asked "whoever reads the words of a song but the author?" And there are certainly many favourite songs, which nothing but good music and good singing could ever bring into notice. These are, however, poems, we will not call them songs, on subjects of wit and science, which must ever be enfeebled by music; while others, truly lyric, and confined to passion and sentiment, travel quicker to the heart, and penetrate more deeply to the soul by the vehicle of melody, than by that of declamation. But we want not to set up one art against another, or to give a preference to singing over declamation; but to assign to each its due place and praise. There are passages in our best plays which could never be sung by the finest performer that ever existed, to so much effect as they have been spoken by a Garrick or a Siddons; while in Metastasio's charming dramas, there are lines and stanzas, by which an audience has been often more completely enrapt, when well set and well sung by a mellifluous and touching voice, than by the most exquisite declamation of the greatest actors that ever existed. Though Henry Lawes severely censures the admirers of Italian music in his preface, yet his first cantata, "Thetis and Ariadne," is both in poetry and music, an imitation of the famous scene in Monteverde's opera of "Arianna," which was afterwards formed into a single heroic song, entirely like this, in *stilo recitativo*, without any air from beginning to end. After the operas of Rinuccini, which had been set by Jacopo Peri, Giulio Caccini, and Monteverde, in that manner, at the beginning of the 17th century, had met with such universal applause in Italy, from the lovers of poetry and simplicity, and enemies to madrigals and music of many parts, this kind of composition had many imitators, not only in Italy, but throughout Europe. All the melodies of Henry Lawes remind us of *recitative* or *psalmody*, and scarce any thing like an air can be found in his whole book of Ayres. As to his knowledge and resources in counterpoint, we are certain that they were neither great nor profound. His works were chiefly published under the title of "Ayres and Dialogues," of which he printed three several books, the first in 1653; the second in 1655; and the third in 1658. Besides these, many of his songs and dialogues were published by Playford in collections, entitled "Select Musical Ayres and Dialogues," by Dr. Wilson, Dr. Charles Colman, Nicholas Laniers, and others. Though most of the productions of this celebrated musician are languid and insipid, and equally devoid of learning and genius, we shall point out one or two of them that seem the most meritorious.

Book the First, p. 11.



Careless of love, and free from fears, &c.

is one of the most pleasing airs that we have seen of this author. We should insert another of his songs entire, in the musical plates, had we room; "A Lover once I did espy;" not so much on account of the beauty of the melody and harmony, though it is one of the best in those particulars, as for the singularity of the measure, which is such as seldom occurs. Harry Carey's ballad "Of all the girls that are so smart, &c." which is a slower kind of hornpipe, resembles it the most of any air which we can recollect. "Little love serves my turn," p. 18. of the same collection, is the gayest air which we have seen of H. Lawes. His other most pleasing ballads are those beginning, "If when the sun," p. 18. and Ben Johnson's song, "Still to be neat, still to be dressed;" see Playford's Collection. But the best of all his songs seems "Come from the dungeon to the throne," p. 107. of Playford's second part; and "Amidst the myrtles as I walk," is pleasing psalmody.

The tunes which he set to Sandys's excellent version of the psalms, as well as those to the Choice Psalms of the same paraphrase, which were composed by Henry Lawes and his brother, in a kind of anthem or motet style, though ushered into the world, in 1648, by such innumerable panegyrics in rhyme, are so far from being superior to the syllabic psalmody of their predecessors who clothed Sternhold and Hopkins in Narcotic strains, that they seem to possess not only less pleasing melody, but less learned harmony, than may be found in anterior publications of the same kind. And this seems to be the opinion of the public: as they were never adopted by any vociferous fraternity, or admitted into the pale of a single country church, that we have been able to discover, since they were first printed. One of these, first published by Henry, to the seventy-second psalm, has, indeed, long had the honour of being jingled by the chimes of St. Lawrence Jewry, six times in the four-and-twenty hours, in a kind of *Laus perpetua*, such as was established in Psalmody island, mentioned in the General History of Music, vol. ii. p. 9.

During the civil war, Henry Lawes supported himself by teaching ladies to sing; however, he retained his place in the chapel royal, and, at the Restoration, composed the coronation anthem. Yet he did not long survive this event, for, in October, 1662, he died, and was buried in Westminster Abbey.

LAWFUL. See UNLAWFUL.

LAWFUL Naam. See NAAM.

LAWING of Dogs, a phrase used in our ancient law-writers. Thus, mastiffs must be lawed every three years, Crompton, Jurisd. fol. 163, that is, three claws of the fore-foot shall be cut off by the skin, or the ball of the fore-foot cut out. See EXPEDITATION.

LAWLESS COURT, a court held on King's Hill at Rochford in Essex, every Wednesday morning next after Michaelmas day, at cock-crowing; at which court they whisper, and have no candle, nor any pen and ink, but a coal. He that owes fuel of service there, forfeits double his rent every hour he is missing.

This court is called lawless, because held at an unlawful hour; or, perhaps, *quia dicta sine lege*; because opened without any form. It is mentioned by Camden; who says, this servile attendance was imposed on the tenants, for conspiring, at the like unseasonable time, to raise a commotion.

LAWLESS Man, *ex-lev.* See OUTLAW.

LAWN, in Gardening, an open space of short grass-ground, in the front of a residence, or in a garden, park, or other pleasure-ground. These, when extended in the principal fronts of habitations, add considerably to the neatness and grandeur of their appearance, by laying them open, and admitting more extensive prospects. Where there is a sufficient

cient scope of ground, they should be as large as the nature of the situation will admit, always being planned in the most conspicuous parts immediately joining the houses, and extended outward as far as convenient, allowing width in proportion; having each side or verge bounded by elegant shrubby compartments in a varied order, separated in some parts by intervening spaces of grass-ground, of varied dimensions, and serpentine gravel-walks, gently winding between and through the plantations, for occasional shady, sheltered, and private walking; or similar walks carried along the fronts of the boundary plantations, and immediately joining the lawns, for more open and airy walking in; and in some concave sweeps of the plantations there may be recesses and open spaces both of grass and gravel, of different forms and dimensions, made as places of retirement, shade, &c.

Though the usual situations of lawns are those just mentioned; yet if the nature of the ground admit, or in cases where there is a good scope of ground, they may be continued more or less each way; but always the most considerable on the principal fronts, which, if they be to the south, or any of the southerly points, they are the most desirable for the purpose.

With respect to the dimensions, they may be from a quarter of an acre, or less, to six or eight acres, or more, according to the extent and situation of the ground. Sometimes lawns are extended over ha-has, to ten, twenty, or even to fifty or sixty acres, or more. But in these cases they are not kept mown, but eaten down by live stock.

The form must be directed by the nature of the situation; but it is commonly oblong, square, oval, or circular. But in whatever figure they are designed, they should widen gradually from the house outward to the furthest extremity, to have the greater advantage of prospect; and by having that part of them within the limits of the pleasure-ground, bounded on each side by plantations of ornamental trees and shrubs, they may be continued gradually near towards each wing of the habitation, in order to be sooner in the walks of the plantations, under shade, shelter, and retirement. The terminations at the farther ends may be either by ha-has to extend the prospect, or by a shrubby or plantation of flatly trees, arranged in sweeps and concave curves. But where they extend towards any great road, or distant agreeable prospect, it is more in character to have the utmost verge open, so as to admit of a grand view from and to the main residence.

But the side-boundary verges should have the plantations rurally formed, airy, and elegant, by being planted with different sorts of the most ornamental trees and shrubs, not in one continued close plantation, but in distinct separated compartments and clumps, varied larger or smaller, and differently formed, in a somewhat natural imitation, being sometimes separated and detached less or more, by intervening breaks, and open spaces of short grass, communicating both with the lawns and interior districts; and generally varied in moderate sweeps and curves, especially towards the lawns, to avoid stiff, formal appearances, both in the figure of the lawns and plantations. In planting the trees and shrubs, which should be both of the deciduous and evergreen kinds, where intended to plant in distinct clumps, either introduce the deciduous and evergreens alternately in separate parts, or have some of both interspersed in assemblage; in either method, placing the lower growth of shrubs towards the front, and the taller backwards, in proportion to their several statures, so as to exhibit a regular gradation of height, that the different sorts may appear conspicuous from the main lawns. They may be continued backwards to a considerable

depth, being backed with trees and shrubs of more lofty growth. The internal parts of the plantations may have gravel or sand walks, some shady, others open; with here and there some spacious short grass openings, of different dimensions and forms.

It is seldom that extensive lawns in parks or paddocks, &c. have any boundary plantations close to what may be considered as a continuation of them beyond the pleasure-ground, but are sometimes dotted with noble trees, dispersed in various parts, at great distances, so as not to obstruct the view; some placed singly, others in groups by twos, threes, fives, &c. and some placed irregularly, in triangles, sweeps, straight lines, and other different figures, to cause the greater variety and effect, each group being diversified with different sorts of trees, all suffered to take their natural growth. Where final, these kinds of openings should always be kept perfectly neat, by being often poled, rolled, and mown, but where they are of large extent, this is scarcely ever the case. See GRASS, GROUND, and TURFING.

LAWNS, in *Commerce*. See CAMBIC.

LAWOROW, in *Geography*, a town of Austrian Poland, in Galicia; 24 miles W. of Lemberg.

LAWRENCE, PETER JOSEPH, in *Biography*, an engineer, was born in Flanders in the year 1715. He distinguished himself, when he was only eight years old, by a considerable turn for mechanics. Cardinal Pelignac being shewn a machine that he had at that early age constructed, predicted that he would one day arrive at eminence in the science of practical mathematics. Before he had attained to manhood, he had executed drains in different parts of Flanders and Hainault, which till that time had been deemed impracticable. He constructed many curious and very ingenious sluices and locks for rivers and canals; and he invented machines that were found of great utility in fortification, and a carriage on which the colossal statue of Lewis XV. was brought to Paris with great ease. He contrived engines, which at once cleared mines of their water, and, at the same time, raised the metallic ores. He formed a junction of the Scheldt and the Somme, which he effected by a subterraneous canal, three leagues in length, the level of which was 45 feet above the source of the Scheldt, and 15 feet below the bed of the Somme. The various mechanical inventions and undertakings of M. Lawrence have been celebrated in a poem by Delille, intitled, "The Treasury of Parnassus."

LAWSONIA, in *Botany*, dedicated by Linnæus to the honour of John Lawson, a native of North Britain, who visited Carolina, and published an account of his voyage, with much information concerning the plants of that country, at London in 1709, in quarto.—Linn. Gen. 191. Schreb. 257. Willd. Sp. Pl. v. 2. 344. Mart. Mill. Dict. v. 3. Art. Hort. Kew. ed. 2. v. 2. 354. Juss. 331. Lamarck. Illust. t. 296. (Alcanna; Gært. t. 110.)—Class and order, *Oëandria Monogynia*. Nat. Ord. *Calycanthemæ*, Linn. *Salicaria*, Juss.

Gen. Ch. *Cal.* Perianth inferior, four-cleft, small, permanent. *Cor.* Petals four, ovato-lanceolate, flat, spreading. *Stam.* Filaments eight, thread-shaped, the length of the petals, and standing in pairs between them; anthers roundish. *Pist.* Germen superior, roundish; style simple, as long as the stamens, permanent; stigma capitate. *Peric.* Berry dry, globose, pointed, of four cells. *Seeds* numerous, angular, with a spongy coat.

Obs. Gærtner, who justly esteems the fruit to be rather a dry berry than a capsule, chuses to call the genus *Alcanna*, a word corrupted from *Al Henna*, the Arabian appellation of the first species.

Eff. Ch. Calyx four-cleft. Petals four, regular. Stamens approaching each other in four pairs. Berry dry, superior, of four cells, with many seeds.

1. *L. inermis*. Henna, or Smooth Lawsonia. Linn. Sp. Pl. 498. Suppl. 219. (L. alba; Lamarck. Dict. v. 3. 106. *L. spinosa*; Hasselq. It. 464. Alienna, five Henna Arabum; Walth. Hort. 3. t. 4. Rauwolf. It. 60. t. 7.)—Thorns none. Leaves obovate, acute. Segments of the calyx as long as its base.—Native of various parts of the Levant. Miller is said in the Hortus Kewensis to have cultivated it in 1759, but it is never preserved long, even in a stove, by our gardeners. The writer of this article obtained seeds in 1787 at Paris, from M. Desfontaines, who had brought them from Barbary. These vegetated at Chelsea, and in some other gardens, producing shrubby plants of a humble stature, which in the ensuing autumn and winter were laden with flowers, whose delicate aspect, and exquisite scent, attracted the admiration of all who saw them. The habit of this species is not unlike Privet, but the leaves are more obovate, and of a lighter green. The flowers are yellowish-white, with purplish stamens, and grow in opposite clusters about the tops of the branches. Hasselquist in his travels, English edition 246, says, "the leaves are pulverized, and made into a paste with (hot) water. They (the Egyptians) bind this paste on the nails of their hands and (soles of their) feet, keeping it on all night. This gives them a deep yellow, which is greatly admired by the eastern nations. The colour lasts for three or four weeks, before there is occasion to renew it. The custom is so ancient in Egypt, that I have seen the nails of the mummies dyed in this manner. The powder is exported in large quantities yearly, and may really be reckoned a valuable commodity. The Arabians call it *Cheenna*. The dried flowers afford a fragrant smell, which women who have conceived cannot bear."

2. *L. spinosa*. Prickly Lawsonia. Linn. Sp. Pl. 498. (Cyprus; Alcanna; Rumph. Amboin. v. 4. 42. t. 17. Mail-anfchi; Rheede Hort. Mal. v. 1. 73. t. 40. Pluk. Phyt. t. 220. f. 1.)—Branches becoming spinous. Leaves obovate, with a small point. Segments of the calyx as long as its base.—Native of the East Indies. It differs from the former, of which many have not unjustly thought it a variety, in having the permanent lateral branches hardened into a spine at their extremities. The fruit answers to Gartner's description of a dry berry rather than a valvular capsule. The leaves seem to vary in shape. Rumphius says they are used to dye the nails in the island of Celebes, &c., and that the Malay women are particularly fond of the flowers, with which they deck their persons and strew their beds. Hasselquist's own specimen, called in his travels, by Linnaeus, *L. spinosa*, proves not to be this plant but the former. Indeed, as we have before hinted, they are most probably but one species.

3. *L. coccinea*. Scarlet Lawsonia. Branches becoming spinous. Leaves elliptic-obovate, acute. Segments of the calyx twice as long as its base.—Sent from Banda by the late Mr. Christopher Smith, as "a *Lawsonia* with scarlet flowers." It is very nearly related to the last, and we find nothing to discriminate this, our specimen being but imperfect, except a difference in the relative proportions of the parts of the calyx, of the certainty or constancy of which we have some doubt.

One might suppose this plant to be the *L. purpurea*, Lamarck. Dict. v. 3. 107, Willdenow's n. 2; but on turning to the *Pouletsjie*, Rheede Hort. Mal. v. 4. 117. t. 57, cited for it, which Linnaeus very erroneously quotes for *L. inermis*, the plant of Rheede will be found widely different

from every *Lawsonia*, as Jusseu well observes, p. 332. The flowers are monopetalous and tetrandrous, with an inferior germen, and this great French botanist suspects it may be a *Pectia*. Of its belonging to his order of *Rubiaceae* there can be little doubt. The *L. purpurea*, therefore, of which Lamarck had seen only leaves, and Willdenow nothing, falls to the ground.

4. *L.?* *Acronychia*. Broad-leaved Lawsonia? Linn. Suppl. 219. Forstl. Prodr. 27. (Acronychia laevis; Forst. Gen. 27. t. 27.)—Leaves obovate, on long stalks. Petals inflexed at the point. Stamens fringed.—Gathered by the Forsters in New Caledonia. A smooth shrub, with round branches. Leaves opposite, an inch or two long, obovate, obtuse, broad, entire, slightly revolute, veiny, smooth. Foxtalks half an inch long, straight, channelled, smooth, united to the leaf by a joint. Clusters axillary, forked, much shorter than the leaves. Calyx with very fine, rounded, pale-edged segments. Petals linear-oblong, hooked inward at the point. Stamens fringed at the base, scarcely so long as the corolla. The fruit is positively described by Forster as "an inflated capsule of four valves." This character, and the totally different form of the petals and calyx, persuade us that the species in question ought to stand as a genus by itself, as Forster originally made it.

LAWSONIA, in Gardening, contains plants of the exotic tree kind for the stove, of which the species are the smooth Lawsonia (*L. inermis*), and the prickly Lawsonia (*L. spinosa*).

*Method of Culture*.—These two plants may be raised by sowing the seeds in pots of light mould, in the early spring, and plunging them in the bark bed of the stove. When the plants have acquired a few inches growth, they should be removed into separate small pots filled with light sandy earth, replunging them in the bark-bed, and giving a little water, with proper shade. They afterwards may be placed so as to have pretty free air, but be constantly kept in the stove at all seasons.

They afford a variety among other stove plants.

LAWYER, (*legista, legisperitus, jurisconsultus*), by the Saxons called *labman*, is a counsellor, or one learned in the law; and lawyers, such as counsellors, attornies, &c. are within the act 3 Jac. I. against extortion; but it has been held only to extend to officers. See COUNSELLOR, ATTORNEY, &c.

LAX, in Geography, a town of Switzerland, in the Valais; 33 miles E. of Sion.

LAXA, a town of the island of Lewis, situated on a bay, on the east coast; 9 miles S.S.W. of Stornamay.—Also, a town of Peru, in the diocese of La Paz; 20 miles S.W. of La Paz.

LAXATIVE MEDICINES, are those purgative or cathartic substances, which operate gently, without producing any considerable discharge from the mucous glands and exhalants of the intestines; such as manna, magnesia, rhubarb, the neutral salts in small doses, sulphur, electuary of senna, &c. For an account of the operation and use of these medicines, see CATHARTICS.

LAXATOR, in Anatomy, a name applied to two muscles of the ossicula auditus. The *laxator tympani major* is the externus mallei of Albinus; the *laxator minor* is simply laxator tympani of that anatomist. The existence of the latter muscle is doubted by some. See the article EAR, where they are described by the names of Albinus.

LAXEMBURG, in Geography, a town of Austria; 7 miles S. of Vienna.

LAXEY BAY, a bay on the east coast of the Isle of Man, in the Irish sea, which affords a shelter from westerly winds,

winds, in about 7 to 10 fathom water. The cape at the southern extremity is called "Laxey Point."

LAXIOR TOGA. See TOGA.

LAXMANNIA, in *Botany*, a name originally given by Forster, in his *Genera*, t. 47, to a syngeneis tree of St. Helena, which Solander considered as a *Banksia*, but which George Forster in his *Plante Atlanticæ*, 56, subsequently referred to *Spilanthus*. We have not discovered it in Willdenow, nor can we ascertain what Schreber decided concerning this plant; but the latter has adopted the name for another genus, of which we are now to speak. It is designed to commemorate the Rev. Eric Laxmann, a native of Finland, Professor at Petersburg, who made many botanical discoveries in Siberia, and died in 1796.—Schreb. 800. Mart. Mill. Dict. v. 3. (Cuminofma; Gært. t. 58.)—Clafs and order, *Hexandria Monogynia*. Nat. Ord. *Aurantiæ*; Juss.

Gen. Ch. Cal. Perianth inferior, very small, of one leaf, bell-shaped, in four roundish segments, permanent. Cor. Petals four, longer than the calyx, linear, coriaceous, equal, spreading, inflexed at the point, marked on the upper side with a triply villosus line. Stam. Filaments six, linear in their lower part, awl-shaped upwards, straight, spreading, rather shorter than the corolla; anthers roundish, incumbent. Pist. Germen superior, roundish, very hairy; style shorter than the stamens, thick, angular; stigma simple, obtuse, furrowed. Peric. Berry nearly globose, of four cells lined with a membrane. Seeds solitary, oblong, compressed.

Ess. Ch. Calyx four-cleft, inferior. Petals four, linear, downy on the upper side. Berry with four cells. Seeds solitary.

1. *L. Cuminofma*. Globose Ankænda. (Cuminofma Ankænda; Gært. Sem. v. 280. t. 58. f. a.—H.)—Fruit globose, slightly depressed. Petals twice the length of the calyx.—Native of Ceylon. Of this we know nothing but from Gærtner, who confounds its synonyms with the following, though he distinguishes it as a species by the shape of the fruit, and relative proportions of the calyx and petals.

2. *L. Ankænda*. Pointed Ankænda. (Cuminofma baccis ovato-acuminatis; Gært. v. 1. 281. Jambolifera; Linn. Zeyl. 58, excluding the synonyms. Ankænda; Herm. Mus. Zeyl. 23. Perin-Panel; Rheede Hort. Mal. v. 5. 29. t. 15.)—Fruit ovate, pointed. Petals many times longer than the calyx.—Native of Ceylon and Malabar. A shrub about four feet high, with round, smooth, leafy branches. Leaves opposite, without stipules, stalked, four or five inches long, and nearly two in breadth, obovate, entire, veiny, smooth and shining, full of pellucid dots. Panicles axillary, stalked, repeatedly three-cleft, corymbose. Flowers greenish-white. Berry ovate, pointed, dark-green, with an aromatic flavour of Cumin.

Mr. Dryander in Tr. of Linn. Soc. v. 2. 232, has well illustrated the synonymy of this plant, which Linnaeus had confounded with the Jambolana, or Jambolains of Acosta, a species of *Calyptanthus*; see that article. This mistake is supposed to have arisen from the tickets of *Madan* and *Ankænda* in Hermann's herbarium having been changed.

LAY, ALLAMPI, or *Alampou*, in *Geography*, a town of Africa, in the kingdom of Niugo, on the Gold Coast.

LAY, or *Lai*, the title of the most ancient kind of songs in the French language. It was not till the reign of Philip Augustus that songs became common in that country. Gautier de Coigny, an ecclesiastic of St. Medard de Soissons, composed a considerable number, which are still preserved in MS. among his other writings. "Lays were a kind of elegies," says M. l'Evêque de la Ravaliere, (An-

cient des Chançons, tom. i. p. 225.) "filled with amorous complaints. The origin of this species of composition is such as rendered it necessarily plaintive: as the word *lai* is imagined to have been derived from *liffus*, Latin, which signifies complaints and lamentations. However there are some lays which describe moments of joy and pleasure more than sorrow or pain; and others upon sacred subjects.

Chaucer, who frequently uses the word *lay*, confines it wholly to songs of complaint and sorrow:

"And in a letter wrote he all his forwe  
In manere of a complaint or a lay,  
Unto his faire freshe lady May."

Cant. Tales, v. 9754.

"He was dispeired, nothing dord he say,  
Sauf in his songes somwhat wold he wray  
His wo, as in a general complaining;  
He said, he loved, and was beloved nothing.  
Of swiche matere made he many layes,  
Songes, complaintes, roundels, virolays—"

Tran. t. 11255.

"Thus end I this complaining or this lay."

Ibid.

In Spencer's time, however, its acceptance was more general, and as frequently applied to songs of joy as sorrow:

"To the maiden's founding timbrels fung  
In well attuned notes, a joyous lay."

Fairy Queen.

Shakspeare and Milton use it likewise indiscriminately for every kind of song.

Lai seems a word purely Francic and Saxon: it is neither to be found in the Armoric language, nor in the dialect of Provence. The French poetess Marie, who in the time of St. Louis, about the middle of the thirteenth century, translated several tales from the Armoric language of Bretagne, calls them *lais*; but the term is of much higher antiquity. After its adoption by the English poets, it soon became a general term in poetry for every species of verse, as song is now: but both these words still retain their particular acceptance as well as general; for by a song is understood a short poem set to a tune, and this was the particular meaning of *lay*, in the last century, among our musical writers.

Tales and songs, says the editor of ancient Fabliaux et Contes François, were the most common and ancient species of poetry. The French, naturally gay, cheerful, and sportive, were more attached to this species of composition than any other nation, and communicated this love for lyric poetry to their neighbours. They must have been in possession of a great number of these songs and tales, because in all social meetings the custom was for every one present either to sing a song or tell a story, as appears by the end of the fable of the priest, "qui ot Mere a force," where we read these verses:

"A cest mots senist cis fabliaux  
Que nous avons en rime mis,  
Pour conter devant nos amis."

And according to John li Chapelain, in his ditty of the Sacrifician of Clugny, it was customary for a bard to pay his reckoning with a story or a song.

"Usage est en Normandie,  
Que qui hebergiez ell, qu'il die

Fable

Fable ou chanson a son oste  
Celle costume pas n'en oste  
Sire Jehans li Chapelains."

" In Normandy a song or tale  
Is current coin for wine or ale;  
Nor does the friendly host require  
For bed and board a better hire."

In the thirteenth century, the songs in vogue were of various kinds; moral, merry, and amorous; and at that time, melody seems to have been little more than plain-song, or chanting. The notes were square, and written on four lines only, like those of the Romish church, in the clef of C, without any marks for time. The movement and embellishments of the air depended on the abilities of the singer. The compass of modern music is much extended since by the cultivation of the voice; for it was not till towards the end of St. Lewis's reign that the fifth line began to be added to the staff. The singer always accompanied himself on an instrument in unison. *Poesie du Roi de Navarre*, tom. ii.

LAY, in *Agriculture*, a term applied to such land as is in the state of grafs, or sward. This sort of ground is frequently dilinguished into such as has been long in the state of sward, and such as is newly laid down to grafs, or into old and new lays. The proper method of managing the latter is of great importance to the farmer, and which, Mr. Young thinks, should be by keeping them perfectly free from all sorts of stock for the following autumn and winter after their being laid down, when, in the spring, they will afford a flow of young grafs highly valuable for sheep, with which they should only be well stocked, and kept down then, and during the whole of the summer: "nothing," in his opinion, "being more pernicious than mowing a new lay, as directed by certain authors. They may," he supposes, "have succeeded in spite of such bad management, but never by it." The most suitable method of managing these new lays, under different circumstances, will be described in speaking of laying lands down to the state of sward or grafs. See LAYING down to Grafs.

It may be observed, that the treatment necessary for old lays must vary much, according to their nature and the particular circumstances under which they are placed, as will be shewn under the management of meadow and pasture lands, as well as in considering the nature of grafs. See GRASS-GROUND, MEADOW, and PASTURE.

It has also been observed, that, on many farms, there are often "tracts of barren lays, from mofs, poverty, neglect, and bad herbage, upon which a very great improvement may be made by a single ploughing in August. For this purpose, a strong four-horse plough must be used with a skim-coulter; then going over it twice, in different directions, with the scarifier, so as not to disturb the flag; harrowing it once, and immediately sowing a quarter of a peck of coleseed, two bushels of cock's foot, and one bushel of Yorkshire white *per* acre; adding some of whatever seeds may be procured at the moment cheaply." It is then advised to be left "unfed and untouched till the March following; in which month, and through April, it should be loaded well with sheep: the use will then be very great. Keeping sheep feeding it heavily through the year, the cole will be killed, and you will have a pasture worth treble what it was before. The expence is said to be small, and the improvement rapid." Various modes of improving land, in the states here described, will be explained under the heads above mentioned.

And the same writer also thinks, that, by December, old lays will be wet enough to begin to break them up: "a

work that should not be done while the land is dry; for it will not then turn up in clean well-cut furrows. Ploughing grafs-land is, it is said, a very good piece of husbandry, when they are worn out and over-run with mofs and other rubbish, or hide-bound. To keep land under such unprofitable turf is bad management. It should, by all means, be broken up, and kept in a course of tillage for three or four years, and then laid down again: by which conduct, four times the profit will arise that could be gained from keeping it in lay."

LAY-BROTHER, among the *Romanists*, a pious, but illiterate person, who devotes himself, in some convent, to the service of the religious.

The lay-brother wears a habit different from that of the religious, nor ever enters into the choir, or the chapter. He is not in any orders, nor does he make any vow, excepting of constancy and obedience.

These lay-brothers make the three vows of religion.

In the nunneries are also lay-sisters, who never enter the choir, &c. and who are only retained for the service of the convent.

The institution of lay-brothers began in the eleventh century. The persons on whom this title was conferred were such as were too ignorant to become clerks, and who therefore applied themselves wholly to bodily labour.

It seems to have taken its rise from hence, that the laity in those days had not, for the generality, the least tincture of learning; whence also those came to be called *clerks*, by way of distinction, who had studied a little, and were able to read.

In some orders they are only retained by a civil contract, which, however, binds them for life; in other orders they are to pass through four years of probation, as among the Jacobins; or seven, as among the Feuillants. The Capuchins admit none before nineteen years of age. The Jesuits call them *coadjutors*.

LAY-Canon. See CANON.

LAY-Communities. See COMMUNITY.

LAY-Corporation. See CORPORATION.

LAY-Fee, *feodum laicum*, land held in fee from a lay-lord, by the common services to which military tenure was subject, as distinguished from the ecclesiastical holding in *frank-almoign*, discharged from those burdens.

LAY the land, in *Sea Language*. See LAND.

LAY-patronage. See PATRONAGE.

LAYS, *vide*. See SIDE-lAYS.

LAY, *vaunt*. See VAUNT-lay.

LAYAU, in *Geography*, a town of the island of St. Vincent, on the W. coast, in a bay at the mouth of a river, to both of which it gives name. N. lat. 13° 8'. W. long. 61° 18'.

LAYBACH, a town and capital of Carniola, on a navigable river of the same name, dividing it in such a manner, that part of the town lies in Upper, and the other in Lower Carniola. The citadel is ancient and has a church; it is inhabited by a countable, who has the title of burgrave, and 12 foldiers. Laybach is the see of a bishop, who is a prince of the empire. The town contains, besides the cathedral, several churches, and about 500 houses; 28 miles N.E. of Trieste. N. lat. 46° 12'. E. long. 14° 30'.

LAYCOCK, or LACOCK, a parish, formerly a market-town of Wiltshire, England, is seated in a fine, fertile valley, on the western bank of the river Avon, three miles from Chippenham, and 95 west of London. In the year 1800 this place contained 147 houses, and 1408 inhabitants. Here was formerly an abbey of large extent, and rich endowment. A large pile of the old buildings still remains in their former monastic

monastic style; particularly the cloister, kitchen, cellars, gallery, &c.; with the fish-ponds and terrace walk. At the S.E. angle of the building is a tower, which contains, among other records, an original copy of the Magna Charta. See Blackstone's "Dissertation on Magna Charta," &c. Some account of the abbey, with a view of the cloisters, is published in "The Architectural Antiquities of Great Britain," vol. ii.; and a full description of the place, and other objects in the vicinity, will be found in Britton's "Beauties of Wiltshire."

**LAYDE**, a town of Africa, in the country of the Foulis, on the Senegal; 45 miles S.E. of Goumel.

**LAYER**, in *Building*. See **COURSE**.

**LAYER**, in *Gardening*, the young shoot or branch of such trees as are capable of being raised by being laid into the ground. It is the part which is placed in the earth in order to strike root, and from the new plant layers are made from different kinds of shoots and young branches, according to their natures and habits of growth.

**LAYERING**, the act of placing layers into the ground. This is performed in different ways, as may be seen under the proper head. See **LAYING**.

**LAYES**, or **LEYES**, a term used in many parts of England for such pasture ground as has been formerly tilled and sown.

**LAYING**, in *Gardening*, the process or operation of placing layers in the soil. It is a method adapted to most sorts of trees and shrubs, and many herbaceous plants. It is effected by laying branches and young shoots of trees and plants in the earth, from two or three to five or six inches deep, leaving their tops out, that the part laid in the earth may emit roots, and become a plant. The layers, when well rooted, should be separated from the parent, and planted in the nursery, or other proper place, to acquire due strength and size, for the purposes for which they are designed. And they require different lengths of time for becoming rooted, from a few months to two or more years.

There are great numbers of shrubs and trees that are capable of being increased by layers, but the practice is more particularly applicable to the shrubby kind; as their branches grow near the ground, convenient for being laid down. It may, however, be practised with success on fruit-trees and forest-trees, when their branches are situated low enough for being laid, though the varieties of many fruit-trees are better propagated by grafting and inoculation. The vine and fig, however, often admit of being increased by layers; and forest-trees, for the continuance of varieties; as the plants raised in this method continue exactly the same as the parent plant from whence they were raised. This is a certain method to continue any approved variety, as well as to increase such shrubs or trees as do not produce seeds here, and which cannot be easily obtained. It is likewise an expeditious and easy mode of propagation; as by it many new plants are often raised in a few months, which would take two or three years to bring them to the same size from seed. In many sorts it is so easy that all the shoots of any branch situated near the ground, or convenient for laying down, may be made distinct plants.

It may be noticed that, for all sorts of the tree or shrub kinds, it is generally performed on the young shoots of the preceding summer, which should be laid down in spring or autumn; but sometimes on shoots of the same year, in summer, especially in the hard-wooded evergreen trees and shrubs, that do not strike root readily in the older wood. Many sorts of trees that have their wood of a loose soft texture often grow pretty freely by layers of them, of two or several years growth.

But in herbaceous plants capable of being propagated by layers, such as carnations, pinks, double sweet-williams, &c. the young shoots of the same year, laid down in June and July, are commonly the most successful.

In regard to the season for performing this sort of work, in most sorts of trees and shrubs, it is autumn and spring, though it may be performed at almost any time of the year.

Many kinds of under-shrubby and herbaceous plants also succeed, if layed any time in spring or summer till the end of June; though that and the following month are the most successful for the herbaceous tribe, as carnations and others usually propagated by laying, as they then root the same season in from three or four to five or six weeks, so as to be proper for transplanting.

When it is intended to lay trees or shrubs that naturally run up to stems, without furnishing any considerable quantity of lower branches for laying, a sufficient number of strong plants should be set in the nursery, at proper distances, and headed down in the autumn or spring after, within a few inches of the ground, that they may throw out a good quantity of young shoots the following summer, near the earth, so as to be convenient for laying down in the succeeding autumn; or, by waiting another year many more shoots for the purpose of layers will be provided, by the first shoots throwing out many lateral ones, each of which when layed will form a plant. And on the layers being rooted, and all cleared away, the stool remaining will furnish another crop of shoots for laying next year, and the same in succession for many years.

Where layers are wanted from trees that are grown up, and whose branches are at a distance from the ground, a temporary stage or scaffold is erected, on which pots or tubs of mould are placed to receive the layers.

The general method of merely laying the branches or shoots in the earth, is practised for all sorts; but previous to laying, they are often prepared in different ways to facilitate their rooting, according as the trees of different natures require; as by simple laying, twisting, flitting, cutting the bark, piercing the shoot, wiring, and other modes.

*Simple Laying*.—This is merely laying the shoots in the earth, as directed below, without any previous preparation of twisting, flitting, &c. and is sufficient for a great number of trees and shrubs of the soft-wooded kinds; but for such as do not readily root by this simple method, recourse must be had to some of the following ways.

*Twisting the Layer*.—By giving the shoot a gentle twist in the part designed to be laid in the ground, it greatly promotes and facilitates the emission of fibres from the bruised part.

*Slitting or tonguing the Layer*.—This is the most universal and successful mode, where any preparation of the shoot is necessary to promote its rooting; it is performed by flitting the shoot at a joint underneath, up the middle, half an inch or an inch or more long, according to the size and nature of the layer, forming a sort of tongue nearly the same as directed for carnation layers; laying that part in the earth, and raising the top upright, or rather pointing inwards, so as to separate the tongue of the slit from the other part, and keeping the slit open, as directed below.

*Cutting the Bark of the Layer*.—This is performed by cutting the bark all round at a joint, taking out small chips all the way below the cut, and laying that part in the earth, by which it readily emits roots.

*Piercing the Layer*.—This is done by thrusting an awl through the shoot, at a joint, in several places, laying that part

## L A Y I N G.

part in the ground, by which it will emit fibres from the wounds more readily.

*Wiring the Layer.*—This is by twisting a piece of wire hard round the shoot at a joint, and pricking it with an awl on each side of the wire in several places, laying it in the earth, by which it breaks out into roots at the confined and wounded parts; often proving successful in such trees and shrubs as do not readily emit fibres by the other methods.

It may be observed that by some of these methods almost all sorts of trees and shrubs may be propagated.

*Method of Laying.*—The general method of laying all sorts of trees or plants, either by simple laying, or any of the other methods, is the following.

The ground about each plant must be dug for the reception of the layers, making excavations in the earth to lay down all the shoots or branches properly situated for the purpose, pegging each down with a hooked stick, laying also all the proper young shoots on each branch or main shoot, fixing each layer from about three or four to six inches deep, according to their length, though some shorten their tops down to an eye or two only above the earth, raising the top of each layer somewhat upright, especially the slit or tongued layers, to keep the slit part open. As all the layers of each plant or stool are thus layered, all the mould should be levelled in equally in every part, close about every layer, leaving an even smooth surface, with the top of each layer out.

It sometimes happens that the branches of trees are so inflexible as not to be easily brought down for laying; in which case they must be plashed, making the gash or cut on the upper side; and when they are grown too large for plashing, or the nature of the wood will not bear that operation, they may be thrown on their sides, by opening the earth about the roots, and loosening or cutting all those on one side, that the plant may be brought to the ground to admit of the branches being laid down into the earth.

Where layers are to be made from green-house shrubs, or other plants in pots, the work should generally be performed in pots, either in their own, or others placed for that purpose.

After laying in either of the above methods, there is no particular culture necessary, except in the heat of summer giving occasional waterings to keep the earth moist about the layers, which will greatly forward them, and promote a good supply of roots against autumn, when those that are properly rooted should be taken off and transplanted.

The layered branches or shoots should be examined at the proper season, October and November, and those that are rooted be cut from the mother plant, with all the root possible, planting them out in nursery rows a foot or two asunder, according to their nature of growth, there to remain till of due size for their several purposes; but those of the tender kinds must be potted, and placed among others of similar nature and growth.

When the layers are all cleared from the stools or main plants, the head of each stool, when to be continued for furnishing layers, should be dressed; cutting off all decayed and scraggy parts, digging the ground about them, working some fresh mould close about their heads, to refresh and encourage their producing a fresh supply of shoots for the following year's laying down. This sort of care preserves them many years.

*Laying-down to Grass, in Agriculture,* the means of bringing such land as has been under the plough into the state of grass or sward. This is a part of husbandry which is of much importance to the farmer, and which requires much care and attention to accomplish it in a proper manner,

under different circumstances of soil, climate, situation, and preparation of the ground. It is well known by practical farmers that some sorts of soil are much more difficult to be brought into the state of good grass or sward than others, and that, when this point has been accomplished, some are much more profitable and advantageous than others, as affording a much better, and more lasting herbage. In some places, too, the business of bringing the land into the state of sward, after it has been in that of arable cultivation, is effected with the greatest ease and facility: the ground, on being left in an unploughed condition, from its natural tendency to the production of herbage, returns to the state of sward, almost without trouble, seed, or expence; while in others, all the art of the most careful agriculturist is found insufficient for accomplishing the purpose. It has been stated by Mr. Davis, that “after twenty years fruitless expectation and expence, the landholders have frequently been obliged to restore the land again to a state of tillage.” But besides this disposition or tendency in soils for taking on the growth and establishment of grass crops, there are other circumstances to be attended to in bringing them to the state of grass or sward, after they have been under the plough; such as those of their possessing neither too much nor too little moisture, and that of their having a sufficient staple or depth of mould for the full and secure establishment of the grass plants. As where the soils are too wet, or too retentive of moisture, they will sustain much injury, if not be wholly destroyed, during the winter season, when there is much rain and frost, as well as be quickly superfered by plants of the coarse aquatic kind, such as the rush, &c.

And where they are too dry, the grasses will be liable to be destroyed by heat during the summer months, by the little moisture which they contain being thus carried away, and of course leave their places to be supplied by other sorts of coarse plants, such as those of the moss, fern, and heath kinds, according to the nature of the ground. A good depth of mould or soil is likewise requisite, in order that the roots of the grass plants may penetrate or run down to such a depth below the surface, as to be in a great measure out of danger from the effects of heat and evaporation in the summer season. On these as well as other accounts, it is therefore better that the lands intended for grass, especially where they are to be kept in a permanent state of sward, should incline in some measure to a state of moisture, or be in such a degree retentive of it, as to preserve that state of humidity which is necessary for the healthy and vigorous growth of the plants, without endangering the destruction of their roots by putrefaction, from its stagnating in too large a proportion about them. It is chiefly on this principle, it is added, that the more light, thin, dry, descriptions of soil are better suited for the production of grain, or the occasional practice of convertible husbandry, than for that of permanent grass or sward.

And there are still other circumstances connected with the nature of the soils, which are necessary to be particularly attended to in the laying of lands down to the state of grass, as those of properly adapting the grass plants to their qualities, some sorts of grasses being much more impatient of wet than others, consequently more proper for the drier sorts of lands; some more capable of resisting the effects of heat and drought, and of course more suitable for the thinner and more porous kinds of soil: while others delight in a moist or wet soil, and are incapable of being grown with any success, on such as are of a dry quality. They likewise differ much in respect to their hardness; some resisting the effects of cold much more effectually than others, and of course more adapted to high exposed situations. Besides these,

these, they vary in other respects, some succeeding to the most advantage in soils of the clayey kind, others in those of a loamy quality, while others delight in those of a sandy nature, a few in those of the calcareous kind, and some in those which partake much of the nature of peat.

In addition to these different natural propensities, there are some grasses that have the property of rising to a great height in the stem, and of course affording a large coarse produce, while others are more limited in this respect, but spread and extend themselves more in a lateral direction, affording a less proportion of produce, but which is of a finer quality. The former, with certain restrictions, would seem better adapted to the purpose of hay, though the latter may be applied to the same use, where the fineness of quality is preferred to quantity of produce. There are likewise some sorts of grasses that contain much larger proportions of saccharine matter in their compositions than others, as well as more leaves and fewer flower stems; and which, from the avidity with which they are fed upon by different sorts of live stock, and the success that attends their being thus consumed in the improvement of such stock, would appear to possess the largest proportion of nourishment; and of course to be the most proper for being introduced where the lands are intended for the purpose of grazing, or fattening animals by means of vegetable food in its grassy state. And further, there is another property of grasses in which they differ considerably; and which is of so much consequence as to require being regarded in the laying of lands to the state of sward. This is that of early growth, which is a circumstance of vast importance in a grazing point of view, as there is in general a great deficiency of grass for the support of stock in the early part of the spring. See *Practical AGRICULTURE*.

It is the opinion of Mr. Curtis, that in the forming of good meadows, or other grass-lands, there should be a combination of these different circumstances, as it is chiefly by the sward, or the quantity of produce, that the cultivator is enabled to support his live stock, and pay his rent; of course no expence in labour or manure is spared to obtain it by the prudent farmer. It does not, however follow, that this should be solely regarded, or that to attain it the coarsest sorts of plants should be cultivated; nor will the grasses that are recommended merely for their being relished by cattle, or for the sweetness of their foliage, if they are found to be deficient in the quantity of produce, fully answer the views of the farmer or grazier, as, to constitute a good meadow or pasture, an abundant produce is necessary. And that, though animals prefer some sorts of food to others, it is not possible to indulge the live stock that is to be supported constantly with the finest and most delicate hay or herbage. Besides, it is not improbable but that the productive grasses may in some cases be highly nutritious, or that cattle may eat as eagerly the herbage or hay made from the coarse as the fine grasses. And cattle are frequently known to thrive on food to which they are habituated by necessity, though at first they could scarcely be prevailed on to eat it. It is suggested, that in making experiments, persons are apt to conclude too hastily from the appearance which a plant assumes on its being first planted or sown; as the most insignificant plant or vegetable will often make a great show, when its fibres have fresh earth to shoot into: "but the trial comes when the object of the experiment has been in a meadow or pasture several years, when its fibres, from long growth, are matted together, and it meets with powerful neighbours, to dispute every inch of ground with it;" if "it then continue to be productive, it must have merit." It is well known, that "lucern, when left to itself, is soon

overpowered; and if broad-leaved clover, which is undoubtedly a perennial, the first year be sown, a great crop is produced; but let the field be left to itself, and the clover, like the lucern, will yearly diminish,—not because it is a biennial, as has been often supposed, but because plants hardier, or more congenial to the soil, usurp its place: this shews, "that at the same time that a good plant is introduced, it should be a powerful one, and such as is able to keep possession, and continue to be productive." Further, that "in respect to the property of cattle's thriving on the food they eat, it is unquestionably of great consequence; and it is to be regretted, that our knowledge of the most nutritious kinds of herbage is so confined: but of those plants which have been in cultivation, we are enabled to speak with some certainty: it is well known, that "clover, lucern, sainfoin, tares, and several other similar plants, have a great tendency to fatten cattle; but what natural grasses, or other plants, which have not been subjected to separate culture, have this particular tendency, and in what degrees, remains to be ascertained by the test of experiment." But, "that as leguminous plants are in general found to agree with cattle, it may be reasonably concluded, that a certain quantity of them may be proper and beneficial in pastures. It is well known that certain pastures are more disposed to fatten animals than others: but how far this depends on situation, and their particular produce, remains to be ascertained." With respect to the property of early growth, it is suggested that the "want of early herbage in the spring is the general complaint of farmers and graziers in all the best grass districts of the kingdom: those plants, therefore, which are found to shoot at an early period, and to put forth early foliage, especially when it is such as is grateful to cattle, must be deserving of great attention. As far as grasses have to do in this business, those mentioned hereafter may effect all that can be expected in this way: much must, however, depend on seasons; if the winter should be severe, or north-easterly winds prevail in the spring months, grassy herbage will be backward, in spite of all that can be done; but in order to counteract the bad effects of such seasons as much as possible, pastures and grass-lands should be warmly situated, and not drenched too much with moisture, being sheltered by thick hedges, and divided into small inclosures." But where early pasturage is the great object of the farmer, there are other plants that may deserve a place among them, such as those mentioned below. And that "though early herbage is highly valuable for pasturage, it is not less so for the purposes of hay; as by the middle of May at the latest, a meadow of this sort would be fit for cutting; and the second hay-making begin by the time that hay-making usually takes place in other cases; and by this means the double advantage be obtained, of a larger produce, and less risk in securing or making it."

It is stated in a late work on *Practical Agriculture*, that "on the principles that have been already explained, there can be little doubt but that by a judicious and due attention to the different circumstances and uses for which grass-lands are intended, as well as to the selecting and mixing of the best and most proper grass-seeds, and adapting them to the particular nature and circumstances of the soils, after they have been brought into a suitable condition for receiving them, those grounds which have been in a state of tillage may be laid down to the state of sward, in a much better and more beneficial manner than has been the case under the indiscriminate use of such as were in, or which have sown themselves on the lands from the contiguous pastures." It has "been long since remarked as extraordinary, by Mr. Stillingfleet, that cultivators should have neglected

to make a proper advantage of plants of such importance, and which, in most situations, constitute the principal food of live stock, from the want of properly distinguishing and selecting such as are the most advantageous and useful under different circumstances of the land." Some have likewise contended, that "the best grass-seeds cannot be collected at too high a rate; as it is possible, by such means, to render lands, which are suited for the production of grass, much more valuable than can be done by the common modes of laying them down."

It cannot, however, but be confessed that much difficulty has been thrown in the way of introducing the most proper sorts of grasses, in laying lands down to sward, from their near resemblance to each other, in many instances, requiring the nicest discernment to distinguish them, and from the want of other means of procuring them."

It has been stated by Mr. Curtis, in his tract on Grasses, that "if grass-lands, such as downs, pastures, and meadows, be carefully examined, they will all, except such as have been recently laid down with rye-grass or clover, be found much in a state of nature, replete with an indiscriminate mixture of plants, some of which produce cattle food of a good kind, others such as is of a very indifferent description; some affording good crops, while others scarcely yield any thing at all." And in the system of Practical Agriculture it is suggested as sufficiently obvious, "that by a careful attention to the procuring of the best and most suitable sorts of grass-seeds, and applying them according to the principles which have been given above, much superiority may be attained in the forming of pasture, or other sorts of grass-lands." See GRASS.

*Method of Preparation of the Land.*—The proper preparation of land for grass-seeds is a part of management, according to the same writer, "that is of vast importance to the success of forming good grass-lands, but which has been much neglected in the practice of laying them down. From the smallness of the seeds, and the fibrous nature of the roots of the grass-plants in most cases, it is evident that lands which are intended for being laid down to the state of sward, whatever their quality may be in respect to soil, should constantly be brought into as fine a state of pulverization and mellowness as possible, before the seeds are put in: as where the contrary is the case, from the lumpiness of the surface mould, the seeds can neither be sown with so much regularity, vegetate in so equal a manner, or extend their roots, and establish themselves at first so perfectly in the land, they are of course more liable to be destroyed by hot seasons coming on afterwards. It is probable that in this way much new laid down grass-land is greatly injured the first summer, especially when it turns out to be hot and dry. The necessary fineness of mould may be obtained in different modes, according to the nature of the lands. In the more stiff and heavy ones, by ploughing before winter, and leaving them to be exposed to the action of frosts and other causes during that season; having recourse to severe harrowing, and occasional rolling, in the early spring months; and by the frequent interposition of such sorts of crops, in the courses that precede those of grass, as have a tendency, from the peculiar nature of their roots, to loosen and render the soils fine, such as those of the bean, cabbage, rape, and clover kinds. The lighter sorts of land may be brought into a proper condition for the reception of grass-seeds, by repeated ploughing and harrowing, or scuffing, and the frequent introduction, in the previous crops, of such sorts of green fallow crops as have a power, by the great degree of shade and stagnation which they afford, as well as by the culture which they require while growing, of bringing the

soil into a fine friable state. These are turnips, potatoes, tares, saintfoin, and others of a similar description." It has been contended by Mr. Clofe, "that where the grass-seeds are to be put into the ground with grain crops in the spring, the tillage should be performed with more than ordinary attention; which, in the case of turnips, will depend greatly upon their being consumed at such an early period as will admit of the ground being thoroughly broken down and reduced; for if there be much delay, and the season prove unfavourable, a bed of mould, sufficiently loose and mellow, will not be procured for the reception of the seeds: and when grown with spring corn, the lands should be ploughed over three times; and where the first of these earths can be given early enough to be influenced by the vernal frosts, it will be found to be much more beneficial." The use of the harrow and the roller will be occasionally necessary, after the different ploughings, according to the nature and state of the land. "But when the sowing is executed in August, the same degree of attention is not believed by the Rev. Mr. Young to be so necessary, as the time and season afford so full an opportunity of bringing the ground into suitable order, that the most inattentive cultivator can scarcely experience any other difficulty than what originates from an unusual wetness of season."

In the System of Practical Agriculture noticed above, it is mentioned that, "besides this fineness of preparation in the soils, it is necessary that the method of cropping and application of manure in the preceding courses be such as to leave them in a state of high fertility and richness; as no good grass-land can be supposed to be produced, where the lands have been worn out and exhausted by the previous crops:—a practice which has, however, been too general in the returning of arable lands to the condition of grass. Mr. Marshall has, he says, indeed very justly observed, that the want of proper condition in the lands at the time of their being laid down to sward, added to those of improper sorts of grasses and bad seeds, is the chief cause of their not succeeding." According to some cultivators, "manure ought to be applied with every other crop, and always with that which immediately precedes the grass. This is," he says, "a practice that should be adopted as much as possible." And "in order to have grass-lands of the best kind, it is likewise of great utility to have them so managed in the preparation, as to be rendered perfectly clean and free from all sorts of weeds; as by their rising with greater rapidity than the sown grass-plants, they are often liable to shade and destroy them, or greatly injure their growth."

And it has been advised by Mr. Billingfley, "in restoring old worn-out lands to the state of good pasture, to clear the land from injurious weeds by means of a full winter and summer fallowing; or, instead of the latter, by a crop of potatoes, well manured for, and kept in a perfectly clean state by attentive culture while growing, succeeded by winter vetches fed off in the early spring." And "in all the more light sorts of soil, it is unquestionably the most beneficial practice to bring the ground into that sort of fine tilth, which is proper for the reception of grass-seeds, by a judicious mixture of green crops of different sorts with those of the corn kind, according to the nature of the soil." The most appropriate methods of combining and intermixing these with each other are fully explained in considering the modes of cropping different sorts of ground. See *Course of Crops, and Rotation of Crops.*

Further: "when the lands have been, by these methods, brought into a good state of fertility, and reduced into a sufficiently mellow and friable condition of mould, the surface should be made as fine, loose, and even as possible"

## L A Y I N G.

And that "where the grounds are much inclined to moisture, the ridges may be preserved, which should be of considerable breadth, with very slight furrows; but in the more light and porous descriptions of land, the whole should be laid as even as possible, without any ridges or furrows. In the former cases, in some districts, they prefer making the ridges six, eight, or more yards in breadth; which, when the land is to be under the scythe, is in a much better state for being mown; and if for pasture, there will be less danger of the animals being injured by being cast in the furrows. But in the latter, the surface will not only be more agreeable in its appearance, but be more advantageous for all the purposes of grass management," when thus laid down.

*Most proper natural Grasses.*—In respect to the kinds of natural grasses, the circumstances that have been observed above render it sufficiently plain, that the proper choice and application of grasses must be a matter of great consequence, in the laying down lands to the state of sward or herbage.

In fact, it is, according to the author of Practical Agriculture, "a business attended with uncommon difficulty, from the number of trials that have been yet made being very inadequate for affording the means of fully deciding

upon their properties, advantages, and uses, in many cases, as well as from their habits, and the soils to which they are the best suited, being often very imperfectly known; and also from the great trouble and inconvenience of obtaining their seeds genuine, and in a proper state of healthy vegetation."

But it is suggested that the plants of the natural grass kind, which have been found by experienced cultivators most useful in the different intentions already mentioned, are "the sweet-scented vernal grass, meadow fox-tail grass, smooth-stalked meadow grass, rough-stalked meadow grass, meadow fescue grass, hard fescue grass, tall fescue grass, crested dog's-tail grass, ray or rye grass, Yorkshire white, cock's-foot grass, tall oat grass, timothy grass, yarrow, burnet, white clover, trefoil, cow grass, rib grass, and a few others;" most of which will be found useful in laying lands to grass, under different circumstances of soil, situation, moisture, and dryness. See GRASS, and these several heads.

The Rev. Mr. Young, in the third volume of Communications to the Board of Agriculture, advises the varying of grass-seeds, according to the nature of the soil, in this way:

### Soils and Seeds.

Clay.	Loam.	Sand.	Chalk.	Peat.
"Cow-grass.	White clover.	White clover.	Yarrow.	White clover.
Cock's-foot.	Ray.	Ray.	Burnet.	Dog's-tail.
Dog's-tail.	York white.	York white.	Trefoil.	Cock's-foot.
Fescue.	Fescue.	Yarrow.	White clover.	Rib.
Fox-tail.	Fox-tail.	Burnet.	Saintfoin.	York white.
Oat-grass.	Dog's-tail.	Trefoil.		Ray.
Trefoil.	Poa.	Rib.		Fox-tail.
York-white.	Timothy.			Fescue.
Timothy.	Lucerne.			'Timothy.'

With regard to the proportions or quantities which are necessary per acre, it is hinted, that "in situations where women and children are fully employed, it may be difficult to procure large quantities gathered by hand: in such places a man must be content with what can be bought. Credited dog's-tail is so very generally to be thus procured, that he cannot but suppose it in a good measure at command.

However, without adverting to this point, he may remark, that from the lands which he has laid down to grass to a considerable extent, and in which he has used every one of these plants largely except the poa, and that on a smaller scale, he is inclined to think that the quantities stated below may be safely employed."

### Soils and Seeds.

Clay.		Loam.	
Seeds.	Substitutes.	Seeds.	Substitutes.
"Cow-grass - - - 5lb.		White clover 5lb.	
Trefoil - - - 5lb.		Dog's-tail 10 lb.	Ray - 1 peck 5;
Dog's-tail - - 10lb.	Yorkshire white 2 bush.	Ray 1 peck.	Rib-grass 4lb.
Fescue - - - 1 bush.	Timothy - 4lb.	Fescue 2 do.	Yorkshire white
Fox-tail - - - 1 do.	Do. - 4 do.; or,	Fox-tail 3 do.	Timothy 4lb.
	Yorkshire white 1 bush.	Yarrow 2 do.	Cow-grass 5lb.

Sand.		Chalk.	
Seeds.	Substitutes.	Seeds.	Substitutes.
White clover 7lb.		Burnet - 10lb.	
Trefoil - 5lb.		Trefoil - 5 lb.	
Burnet - 6lb.		White clover 5 lb.	
Ray - 1 peck.		Yarrow - 1 bush.	Ray - 1 bush.
Yarrow = 1 bush.	Ray 1 peck. Rib 4lb.		

## LAYING.

Seeds.	Peat.	Substitutes.	
White clover	- 10lb.		
Dog's-tail	- 10 lb.	Yorkshire white	6 pecks.
Ray	- 1 peck.		
Fox-tail	- 2 do.	Rib	5lb.
Fescue	- 2 do.	Cow-grafs	4lb.
Timothy	- 1 do."		

*Method of sowing Grafs-seeds.*—In respect to the time and manner of sowing grafs-seeds, they are different in practice according to the preparation and the particular circumstances of the land. The most usual period of putting in grafs-seeds has been the spring, at the time the grain crops are sown: but where the land has been brought to a suitable state of preparation by means of green and other fallow crops, the latter end of the summer, as about August, has been the more general time. In the former case they are most commonly put in with the grain crops; but in the latter without any other sort of crop. The author of the System of Practical Agriculture remarks, that "there has been much diversity of opinion among agricultural writers with regard to the superior utility of these different seasons of introducing the seeds, as well as with regard to their being sown with or without other sorts of crops. The advantages of the autumnal over those of the vernal sowings are contended to be, those of the grafs-plants being less exposed to danger from the shade, closeness, and choking, that must necessarily occur at the latter season, there being less risk of flocking the ground with noxious weeds in case of the seeds of hay-chambers being indiscriminately sown; their being put in upon a better preparation and more mellow and fertile state of the land; their growth being more strong and vigorous from their not being robbed of their proper nourishment by other exhaulting crops, and the great superiority of the hay produce: while, on the contrary, it is maintained in support of the vernal sowings, that besides their being less precarious, shade is necessary in the early growth of the grafs-plants to protect them from the effects of heat; the moisture is better preserved in the soil for their support; small annual weeds more effectually prevent it from rising to injure them; and the loss the farmer must sustain from the want of grain crop guarded against."

But in regard to the objection on the ground of weeds being produced, Mr. Clofe has remarked, that "sowing rubbish in August is not of so great importance as in the spring. In the former season all the annual seeds vegetate, and if the beginning of the winter be mild, they will blossom; but they cannot perfect their seeds, and thus stock the land with noxious weeds."

Upon which the first of these writers observes, that "though some of the arguments urged on both sides of this controverted point may be objected to, the autumnal sowings not preventing the perennial weeds from rising and seedling their seeds in the following summer, nor the great closeness of grain crops being without injury to the growth of the young grafs-plants; there are facts which render it probable that each method may have advantages under particular circumstances. In the more southern districts, where the severity of the winter season is later in its approach, the autumnal season may frequently be made use of with advantage, after fallow crops, for sowing grafs-seeds, especially in cases where the lands are in too rich a condition for the successful growth of corn. But in the more northern

parts of the kingdom, and exposed situations, where the frost sets in at an early period, it may be in general the most advisable practice to put the seeds in, in the vernal months, with suitable crops of the grain kind." And the Rev. Mr. Young has observed, that "grafs-seeds answer almost equally well in either method: he prefers, however, the August sowing without corn, though the success of his trials in the different seasons has not justified any decisive conclusion." It is even admitted, that "in moory and mountainous situations, where the snows come early, autumnal sowings are not advisable, or to be performed later than the very early part of August; the vernal season with oats, for being cut young for foiling or hay, is constantly to be preferred." Mr. Dalton, in Yorkshire, after trying other methods, also recommends the autumnal season without corn as the most advisable. And the Rev. Mr. Clofe states, that "a friend of his, wishing to procure good meadow or pasture around his house, fallowed the land for barley; but the spring proving wet, and the soil being a strong loam, he could only put half of it in order for that crop, which was sown and laid with clover and rye grafs. The other part was fallowed and sown in August with the sweepings of hay-chambers. The barley was a good crop, and the clover and rye-grafs were probably equal to the first year's cut of hay. The second year the artificial grasses began to fail; worse the third, fourth, and fifth; the sixth year, after having received two dressings, the spontaneous product of the soil began to give a fleece over the surface of the land. About ten years after these lands were sown, Mr. Clofe saw this field, when the part sown in August was worth at least fifteen shillings per acre more than the part which had been sown with artificial grasses in the barley. Thus from actual experiments, numbers of which he could adduce, he concludes that sowing the sweepings of hay-chambers in August, is preferable to sowing any artificial grasses in the spring with any crop of corn. Suppose the corn worth five pounds per acre, the difference in the produce of hay or feed in the second, third, fourth, and fifth years, would more than counterbalance this; and the proprietor would find a permanent improvement in his land of from fifteen to twenty shillings per acre." Mr. Young thinks, the best season in the whole year for this purpose is August, and the only one admissible for it on strong, wet, and heavy soils, in forty years' experience having never failed at that period. It is stated in the System of Practical Agriculture already noticed, that "on comparative experiments being made with corn in the spring months, and without it in August, the latter was found by much the best mode by different cultivators." But that in the experiment of an accurate agricultor, mentioned by the Rev. Mr. Young, in his paper in the communication to the board, "in comparing different methods of vernal sowings, in which four acres were sown with seeds alone, on pease and buck-wheat ploughed in the preceding autumn; five acres with barley, and five more with the seeds put in alone without corn or manure: the portions sown alone were over-run with weeds, and only preserved from being smothered and destroyed, by being eaten down by a dairy of cows." And others, after repeatedly trying the experiment of sowing in the spring with corn, and the autumn without, and from long and extensive practice, conclude, "that, even if we were to have no regard to any other circumstance, except the grafs crop alone, it would be always best to sow it with some kind of grain; but when we consider likewise the loss that the farmer thus sustains for want of a crop of grain, the practice of sowing alone must be looked upon as highly pernicious to the farmer."

And he supposes, that it is probably in this last respect that the greatest disadvantage of the practice consists, as without it the farmer can derive no immediate recompense for his great expence of tillage and preparation of the land."

In cases where the vernal sowing with other sorts of crops had recourse to, barley is that, according to Mr. Cartwright, which is most usually recommended, and "there seems to be no question that barley is in general the fittest grain to be sown with grass-seeds. The same tillage which answers for the one is requisite for the other. Barley has a disposition to loosen the texture of the ground in which it grows; a circumstance highly favourable to the vegetation of grass-seeds, which require a free and open soil to extend their roots in; the tender and delicate fibres of which have much difficulty in contending with the resistance of a stubborn soil. And this points out the reason why grass-seeds so frequently fail on strong land not in a proper state of cultivation. In the choice of barley, that sort should be preferred which runs least to straw, and which is the soonest ripe." But the writer of the System of Practical Agriculture observes, that as from the grassy nature of the stem, and the large size of the ear in this sort of grain, a considerable degree of closeness and shade must constantly be kept up, it should never be sown so thickly as in other cases where there are no grass-seeds. Some object to sowing grass-seeds with barley on other principles, as those of its drawing its nourishment from the surface, which is also the case with the grass-plants, and that in consequence they must be greatly retarded in their growth from the want of due support. Where the land is in a proper state of preparation and tillage, if sown with oats, they will be apt to become so luxuriant as to greatly injure, if not wholly destroy, the young grass-plants by the closeness of their shade. In some cases they, however, succeed tolerably with this sort of crop. On the stronger kinds of land the sowing of grass-seeds has been found to answer well with thin crops of beans. In an experiment of this kind, it is stated that Mr. Dalton found that the beans did not "rob, but sheltered and nourished the grass-plants, the plan answering beyond expectation."

It is suggested, that in order to effect the purposes of distribution and perfect vegetation in the most complete manner, the seedman should "be accustomed to the business, and the seeds, as being of different weights, &c. as little mixed with each other as possible. It is much better to have more casts than to blend the seeds together for the sake of dispatch. For all the smaller sorts of seeds, it has been supposed by the Rev. Mr. Young, preferable to deliver them by means of the Norfolk turnip trough, which has lately been adapted to clover and ray-grass. And this operation should always be performed as soon after the land has been ploughed as possible, as under such circumstances the seeds vegetate in a much more quick and vigorous manner. But it should never be attempted in such a wet state of the land as produces any great degree of tenacity or adhesiveness in the mould, as in such circumstances the seeds would be apt to come up in a tufty unequal manner. Nor for the same reason should the lighter sorts of grass-seeds ever be sown in windy weather; as the delivering them in an equal and regular manner is a point of consequence to the forming of good grass-land. In the covering in of the seeds, the author just mentioned observes, that care should be taken that none are left in an exposed state on the surface of the ground, as where that is the case many of them will be destroyed or picked up by birds, and the sward appear patchy. This business is executed in the most complete

manner by a pair of light short-tined harrows at one tining. The practice of employing bush-harrows is improper, as in that way the seeds are liable to be drawn into lumps. In all the lighter and more spongy descriptions of land, it may be advantageous to pass a light roller over the surface immediately after the seeds have been well harrowed in." And "in cases where the tenants and not the proprietors of the land are to lay them down to grass, it may be the most advisable practice for the latter to procure the seeds, but at the expence of the former, especially where they have a sufficient interest in such lands; as, without this precaution, from their general propensity to keep the ground under the plough, and their indifference in respect to the obtaining of the most proper sorts of seeds, there may be danger of the business being improperly performed."

*Proper Management after being laid down.*—It may be remarked, that the proper conducting of this business is a matter of considerable importance, and a point upon which much of the success of forming good grass-land must in most circumstances depend. It is advised by some, as soon as the crop with which the seeds have been sown has been removed, to have recourse to rolling the land with a moderately heavy roller, when it is in such a state of dryness as just to admit the impression of the implement; as by this process, from the mould being pressed closely about the roots of the plants, their early growth may be much benefited, and the danger of drought in some measure obviated. The practice is, however, in the opinion of others, the most necessary in the more light and porous descriptions of land. There are still others, likewise, who recommend the application of manure at this period, in order to promote the growth and support of the young grass-plants; a point which would seem quite unnecessary where the above mode of preparation has been had recourse to. The writer of the System of Practical Agriculture, however, states that "as the surface of such grounds as have been newly laid down to the state of sward is, from the previous tillage which they require, extremely tender, and readily broken into holes for some time even in the drier descriptions of land, the turning-in of the cattle with the view of feeding them down till, in most cases, be highly prejudicial by the treading which they cause. The best practice is, therefore, probably to suffer no sort of stock to be put upon such lands till the spring after their being laid down; or where the farmer finds it absolutely necessary to turn upon the lands, the lightest sort of stock should constantly be selected for the purpose." And "it has been observed by the Rev. Mr. Young, that the advantage of feeding such lands during the autumn and winter seasons, is scarcely matter of any consequence, as the spring feed for sheep, where it is omitted, is of so much greater utility, a very early pasturage being in this way afforded for ewes and lambs." Mr. A. Young is also decidedly of the same opinion in his Farmer's Calendar.

There are much diversity and contradiction in the opinions of experienced cultivators as to the future management in different states and circumstances of the lands, some supporting the superiority of keeping the ground closely fed down by sheep or neat cattle, while others consider mowing or feeding as preferable. "There seems little reason to doubt but that feeding by some sort of stock is a much better practice than those of either mowing or feeding; the chief difficulty is in respect to the sort of stock that is the most proper. On the dry and more firm sorts of ground, a mixed flock may be the most advantageous, as neat cattle and sheep, as in that way the new pasture may be fed down in the most regular manner; but on those that are of a more open,

## LAYING.

open, porous, and less firm quality, sheep, by their eating so closely, may do much harm, especially in the first years of the new lay, by pulling up the young and imperfectly established grafs-plants. Several instances of this kind have been noticed in such soils. In lands that are more inclined to moisture, the confining of the produce by neat cat's milt constantly be liable to do mischief, except in very dry seasons; they must of course be principally fed down by sheep. And in all cases where the new lay is chiefly constituted of the more coarse sort of grasses, sheep would seem to be the most proper kind of stock, as the grasses are thereby constantly becoming more fine and sweet. Many facts of this nature have been noticed by cultivators. The sweetness of the pasturage on many sheep-downs has been remarked to depend more on their being kept closely fed down than any other circumstances, as on being neglected in this respect it becomes coarse, and is rejected."

*System of Practical Agriculture.*—It has been well observed by the Rev. Mr. Young, in a valuable paper, in the third volume of Communications to the Board, that "sheep-feeding not only ameliorates by enriching the soil, and fixing the herbage, but also by destroying weeds." And Dr. Dickson has "been assured by a very extensive and experienced cultivator in Somersetshire, that under this sort of management, not only many coarse grasses, but other sorts of plants become fine, and eagerly fed upon by animals." It is still farther stated, that "Dr. Wilkinson, who has been much in the habit of comparing different practices, advises the grazing constantly with sheep, and for the first six years never to permit the scythe to touch the lays;" but this is certainly longer than is necessary to preclude the scythe in many sorts of soil. And the Rev. Mr. Young has remarked in addition, "that it is not merely the first year that feeding with sheep is the best practice on new lays, but it may be so managed the second, and if it extend to the third it is the better: and though there is not any necessity for adhering to it any longer, it has been found to answer well in his practice, four, five, or even six years; and in general it may be concluded, that the more the land is fed with sheep, the greater the improvement will be. But in this management the impoverishing absurd system of removing the animals to be folded in other places, is not to form any part of the practice."

In the Agricultural Report of the North Riding of Yorkshire it is suggested, that "it has been long the practice in that district, with the most improved cultivators, to have recourse to the method of sheep-feeding for some time after laying the lands down to grafs, as two years or more. Where ray grafs and white clover are intended to remain some years, it is found by some advantageous to eat them the first year by the sheep, in closing, thickening, and rendering them more permanent." These facts are all in evidence of the great propriety and utility of the practice of feeding new grafs-lands. It must, however, be observed, that in order to render the practice perfectly safe and beneficial, the new lays should not be fed during the autumn, or the stock turned into them at too early a period in the spring. "Nor should they be too heavily stocked, or the stock kept in the pastures too long, especially when it consists principally of sheep, as they may do much harm by paring and eating the plants so closely down as immediately to kill them, or expose their roots too much to the destructive effects of drought. And in cases where the grasses have run up much to stem, if the lands be sufficiently stocked with plants, it may be beneficial to cut them over, by means of a strong scythe, before their seeds are formed, as

by this means they will become more strong and vigorous; but, in the contrary circumstances, they are better left for the purpose of providing a more abundant supply of young grasses, as the benefit obtained in this way will more than counterbalance the injury sustained by the running up of the old plants." But the author of the System of Practical Agriculture states, that "though the practice of feeding new laid grasses in the first years appears to be the most advantageous and proper mode of management, especially for lands intended for pasture, there are many cases in which they may be mown with great success. This practice is perhaps always the most beneficial and proper, and indeed the only one that can be adopted, in such soils as possess any great degree of moisture; as, under such circumstances, the feeding them down with any sort of live stock must, in most seasons, be injurious to the sward. And, besides, where the object and intention of the farmer is chiefly hay, the grafs-plants, by being kept closely eaten down by live stock for a considerable length of time before the scythe is applied, may, from their becoming thereby disposed to a low and lateral spreading growth, be afterwards more unfit for the production of hay crops. Several facts of this nature are related by writers on husbandry. In one case, where different divisions of land of the same kind were laid down in the same manner, on one of them being kept in the state of pasture, and the other alternately mown and pastured; after some years, both being shut up for hay, that which had been pastured afforded a much inferior produce to the other. The same thing has happened in other cases of old pastures being converted into hay lands, even when the most favourable season prevailed." It is consequently concluded, that "on these principles, it may be a more judicious practice to manage lands designed for hay, without having them for any great length of time, previously to their being mown, fed down closely with stock; as in this way a larger produce of hay may be afforded." And it is supposed, that "where the new lays are mown the first year after being laid down, which is not a method to be recommended, it is an excellent practice to apply a moderate coat of manure over them in the autumn, especially when the state of the land and the season is such, in respect to dryness, as to admit of its being done without injuring the surface sward; as by this means the grafs-plants not only become more strong and vigorous, but better established in the soil, and of course bear cutting with much less injury."

But as it may be the case sometimes, though seldom, where these modes are fully attended to, that the farmer may fail either in part or wholly of producing a good lay; it has been observed, that, "in the first case, it is the best practice to have recourse to sowing fresh seeds, which should be performed in the early part of the spring, when the weather is in a moist state; the seeds being advised by some to be trodden in by putting sheep upon the land, either indiscriminately, or by very open ploughing, as the use of the roller will not be effectual, and that of harrowing cannot be practised without injury." It is stated that a large cultivator at Enfield found advantage from putting the seeds in before the manure was applied in the new lays, which are sometimes too hastily ploughed up. By either method, the sward of such lays may often be much thickened, as well as benefited in other respects. And that, in cases where the grasses have run up much to stem, if the lands be sufficiently stocked with plants, it may be beneficial to cut them over, by means of a sharp scythe, before their seeds are formed; as by this means they will be more strong and vigorous, and the lands be less injured; but, under the contrary circumstances,

stances, they are better left for the purpose of providing a more abundant supply of young grasses, as the benefit obtained in this way more than counterbalances the injury sustained by the old plants being left upon the land. But that where there is a complete failure from particular causes, the most advisable method is, where the feeds have been put in, in the spring, with grain crops, to take off these crops as soon as they admit of it; and, after giving the land one ploughing, to harrow in directly fresh feeds, which should be accomplished as early in the beginning of August as it can be performed; and a roller may be applied over the land, when in a suitably dry condition, about October. But that where the latter end of summer has been the time of sowing, it is advised "that the land should have three ploughings performed upon it in the early spring months, when the weather is sufficiently dry, and the grass-seeds be again put in with the crop of buck-wheat in May, which, though it is not a suitable crop for the heavy wet sorts of land, sometimes answers well in dry seasons, and in wet ones, as affording but little feed, may be mown when in blossom as green food for the cows." From the land not being much robbed of its fertility in this way, it may be a beneficial practice.

The application of manure to new laid down grass lands is seldom absolutely necessary: yet where they have not been returned to the state of sward under that degree of fertility and preparation which has been inculcated, it may, in many instances, be had recourse to with great advantage and improvement: as it is perhaps one of the best methods of preserving a good clove late of grass or sward, when properly employed. Mr. Maxwell states, in the third volume of Communications to the Board, that "though in general no manure will be wanted till the land has been mown for hay, there can be no doubt but that great additional improvement will be produced, where manure of any sort can be applied;" and that "the oftener the land is manured, the greater will be the improvement." Where lands have been laid to sward or grass with grain crops, the application of light dressings of manure in the following autumn may be of much utility in fixing and encouraging the growth of the young grass-plants, as has been seen; but in other cases, the latter end of the summer following, or very early in the autumn, are supposed by some to be the most beneficial and proper periods for the purpose: "but as at these times, in many instances, much loss of manure may be sustained both by evaporation and the washing of heavy rains and snows, it may be a better and more advisable practice to perform the business in the early spring months, especially where the lands are to be conducted under the scythe; as in this way the enriching material will be ready to exert its influence at the moment the young plants begin to fend forth their new shoots, and thus not only afford more assistance in thickening and invigorating the new sward, but be less in danger of being uselessly dissipated and waited." But "where manure cannot be spared for repeatedly dressing new grass lands, as the grasses are often, especially on lands not suited to their growth, liable to decline and become thin, in some instances, it is supposed, from the town grasses disappearing before the spontaneous ones have attained sufficient vigour and strength; but more generally, probably, from the grounds not having been in a proper state of fertility, or fineness of surface mould, at the time the seeds were put in; or the particular unfavourableness of the season, about the clove of the third summer after their being sown. It is believed by the Rev. Mr. Young, to be a better practice to defer the use of manure till that time, on such lays as are

pastured; and when they are under the scythe, till the hay crop has been taken from the ground. We have no doubt of the success of the application of dung top dressings at these periods, though they must evidently be made use of in a less economical manner than at a later season in the autumn, or an earlier one in the spring. And it is the most common opinion, that all the finer and more soluble kinds of top dressings are applied with the greatest benefits in the very early spring months, as about the latter end of February, or the beginning of the following month. The differences in the effects of these sorts of manure have perhaps not yet been fully ascertained, under different circumstances of application."

With the view of encouraging and supporting the growth of the natural grasses, when the sown ones decline, as about the third year, an experienced cultivator at Enfield, who seems to favour the opinion of manure being the most usefully laid on land early in the autumn, or on hay lands immediately after the crops have been taken off, states that "he has used coal-ashes with great success, to the amount of three chaldrons per acre. He has laid of this manure on grass land above fifty chaldrons in a year. About eight years ago, he laid down a field of twelve acres with broad clover principally, intending it to stand only for two years. In the summer it was mown twice; next year it was grazed: the clover was but weak. As he had particular reasons for altering his mind, and for wishing to continue it in grass, he resolved to try the effects of grazing it with sheep. On the fourth year it looked so very bad, the clover almost entirely disappearing, that he was tempted to plough it up. He, however, resolved to continue the grazing, and to give it a dressing of three chaldrons per acre of coal-ashes. The next year he observed the white clover and natural grasses beginning to form a clove turf; and the field is now an excellent piece of sward, without the aid of any hay-seeds." And it appears from the further trials of the same cultivator, that the following substances have much effect, not only in promoting the growth and rendering the herbage more fine and sweet, but in renovating the sward:—the scrapings of the road, sand drift, fold-yard liquor, and watering; and that the effects of other manures would seem to be chiefly in promoting the luxuriance of the grasses, and of course to be principally advantageous in increasing the quantity of produce; such as "tallow-chandlers' graves, when used in proportion of a ton an acre; and night-foil, when laid on to about three horse cart loads the acre. And that in fixing, producing, and rendering the white clover more permanent, marle, or strong cold land, and coal-ashes, on wet soils, have been highly beneficial. On the drier clayey lands in Cornwall, "sea-sand has been found to mellow the clay, and make them hold the grasses." And on what are termed stone brash lands, the use of marle is often found of great utility, when applied in the latter part of the summer of the first year of the lay. But it is necessary, to the success of this sort of application, that the ground be well covered with grass before it is applied; as where the surface is much exposed, the marle is liable to plaister and cake together, and the young grass-plants to be, in consequence, exposed to much injury from the heat of the summer. This substance seems to bring up the best sort of natural grasses; but in time it sinks below the reach of vegetation. About thirty cart-loads are sufficient for the acre. And chalk, on the deep loamy clays, was found by Mr. Davis an useful application the first year on new lays, in the proportion of about twenty loads to the acre. On the more sandy sorts of land, clayey marle may be of great advantage in establishing

blishing the grass; and on peaty or moory lands, marle and other similar materials will be found of advantage in rendering them more compact, and better fitted for preserving the grasses; as well as sand and road-stuff, for lining the herbage, and rendering it more palatable to the flock.

Though "foot has been much used as a top-dressing, it has not been found that its effects last beyond the first year. It has been tried to the amount of sixty bushels *per* acre, at *Sd. per* bushel; perhaps it should be used in larger quantity. Lime is nearly as dear, and of that 160 bushels have been used *per* acre on arable land. Soot should perhaps be laid on to that amount. Sugar-bakers' scum has been used with great success to the amount of two loads an acre, at half a guinea *per* load, which has been found a strong warm manure, highly serviceable on cold land, its effects being permanent. Lime is also found useful on the more friable red loamy soils, by fixing and rendering them more close, to keep the vegetation more to the surface, as well as to promote the growth of the natural grasses, and prevent their roots from being injured by the heat of the sun. And woollen rags, though not generally used as manure on grass-land, when chopped small, have been spread with advantage on young clovers before winter, to the amount of about 10 cwt. *per* acre," being useful in protecting and nourishing the young grass-plants in their more tender growth, but they are slow in producing their beneficial effects.

On applying, in order to compensate for an immediate crop of hay, and to thicken the sward on one part of a field, rotten dung about eight tons to the statute acre, on another part woollen rags chopped at the rate of 100 stones to an acre; and on a third a rich marle in the proportion of about 80 tons to the statute acre; Dr. Campbell found, on comparing their effects two years afterwards, that "the dung had produced the greater luxuriance. The woollen rags had a superior verdure, a deeper green: but as they had not yet been properly incorporated with the land, by the grass growing over them, their ultimate produce could not be ascertained." An acre of land may, it is supposed, "be manured by this means for about *3l.* effectually, should they be found to answer the purpose." The same is the case with "the marle, which having covered the ground into which it is not yet carried down by the rains, and the grass not having-grown through, it has at present rather done harm than good." On this account, he supposes that "marle is long in producing its beneficial effects, and the return of which cannot be looked for in less than two or three years."

It is evident from these facts, that different effects may be produced on grass-lands by the application of different sorts of substances or materials to them in the manner of top-dressings after they have been laid down to grass; and that "where fine herbage is the principal object in view, coal ashes and composts of the earthy kind formed from sand, mud, scrapings of roads, and other similar materials, intimately blended and incorporated with suitable proportions of well rotted dung, may be the most beneficial applications;" also that "the liquor of fold yards and watering may be useful in the same intention as well as those of restoring the grass-plants or swards, and promoting the luxuriance of the crops." But that "where the increase of produce is chiefly aimed at, good dung in a well reduced state, tallow-chandlers' graves, night soil, chopped rags, foot, scum of sugar, and other substances of the more animal kind, are the most effectual and proper." While in the intention "of establishing, preserving, rendering durable the different grasses, marle, lime, chalk, the folding of sheep, and other substances and practices of the same sort, will be the most proper for producing such effects." And that in "render-

ing the lands more firm and solid, the three last substances may perhaps be employed with the greatest success and advantage." See MANURE and GRASS Land.

LAYING-out Homesteads. See HOMESTEAD and FARM Buildings.

LAYING-out Lands, the manner of distributing the land of a farm or an estate. See FARM.

LAYING-out Roads, in *Rural Economy*, the mode of planning and laying out the lines of roads. See ROADS.

LAYING-down, or Laying-off, in *Ship Building*, delineating the ship to its full size from the given draught upon the mould-loft floor, for the purpose of making the moulds by which the several parts of the ship is provided.

LAYING, in *Ropemaking*, the closing of the strands together, to compose the rope.

LAYING-hook, the hook on which the strands are all hung together for laying or closing.

LAYKAN, in *Geography*, a small island in the East Indian sea, near the S.W. coast of Celebes. S. lat. 5° 52'. E. long. 119° 51'.

LAYMAN, a person not engaged in any order of ecclesiastics: accordingly, in the distribution of the people, *laity* is opposed to the *clergy*, and may be divided into three distinct states, *viz.* the *civil*, the *military*, and the *maritime*.

LAYMAN, among *Painters*, a little statue, or model, either of wax or wood, whose joints are so made, that it may be put into any attitude, or posture. Its chief use is for the casting and adjusting draperies, for the clothing of figures.

Some call it, after the French, *manequin*, q. d. *a little man*.

LAYMABAMBA, in *Geography*, a town of Peru, in the jurisdiction of Chacapayas.

LAYMOU, a town on the S. coast of the island of Ceram.

LAYR. See LAIR.

LAZA, in *Geography*, a town of Spain, in Galicia; 18 miles E.S.E. of Orense.

LAZANILLA, a town of the island of Cuba; 40 miles E.N.E. of Spiritu Santo.

LAZARE BUEY, a town of Spain, in New Castile; eight miles from Toledo.

LAZARETTO, a small island in the Mediterranean, near the N. coast of the island of Candy, formerly used by the Venetians as a lazaretto, but now deserted.

LAZARETTO *Vecchio*, *Il*, a small island in the neighbourhood of Venice, formerly called "St. Maria of Nazareth," from a church of that name built by Angustin Hermits in 1249. Since the year 1422, all ships coming from the Levant, are to perform quarantine in this island, for which purpose it was provided with the necessary inns, which were rebuilt and enlarged in 1565. Here all the ships and merchandise are closely inspected, under the direction of a deputate of the senate.

LAZARETTO, or *Lazar-house*, a public building, in manner of a hospital, for the reception of poor sick.

LAZARETTO, in some countries, is an office appointed for persons coming from places suspected of the plague, to perform quarantine. See QUARANTINE.

This is usually a large building, at a distance from any city, whose apartments stand detached from each other, &c. where ships are unladen, and their crew is laid up for forty days, more or less, according to the time and place of their departure.

We are indebted to John Howard, esq., the most distinguished philanthropist, who has appeared in this or any other country, and whose services in the cause of humanity

can never be forgotten, (see his biographical article,) for a particular account of all the principal lazarettos in Europe, with plans of the buildings, a detail of their chief regulations, and very important and useful hints for their improvement. With this view he determined, towards the end of the year 1785, notwithstanding the expence and danger which he thus incurred, to visit them in person. Accordingly, the first lazaretto which he inspected was that at Marcellis, which is situated on an elevated rock near the city, at the end of the bay, fronting the south-west, and commanding the entrance of the harbour. This is a spacious building, and its situation renders it very commodious for the great trade which the French carry on in the Levant. Within the lazaretto is the governor's house, a chapel, in which divine service is regularly performed, and a tavern, from which persons under quarantine may be supplied with necessaries. In order to prevent any communication, that is not allowed by the regulations of the establishment, there is a double wall round the lazaretto; and at the gate there is a bell for calling any person within this inclosure; and by the number and other modifications of the strokes, every individual knows when he is called. At Genoa, whither Mr. Howard next proceeded, the lazaretto is situated on the sea-shore, near the city, detached from other buildings, and encompassed by a double wall. Another lazaretto, belonging to the Genoese, stands on a rising ground at Varignano, near the gulf or noble port of Spezia. At Leghorn there are three lazarettos; one of which is new, having been erected in the year 1778. The lazaretto at Naples is very small; that at Messina lies on an island near the city. At Naples there are two kinds of quarant performed; one by ships with clean bills of health, and the other by ships with foul bills. The first, called the petty quarantine, lasts 18 days, and the ships which perform it lie at the entrance of the port near the health-office. The other, called the great quarantine, is performed at a lazaretto, situated on a peninsula near the city. The health-office at Zante is in the city at the water side. The old lazaretto is distant about half a mile from the city, and situated on a rising ground near the sea. There is another called the new lazaretto, which is appropriated to a numerous body of peasants, who pass over to the Morea to work in harvest time; on their return, they perform here a seven days' quarantine; and other persons perform 14 days' quarantine in the old lazaretto. The lazaretto at Corfu is finely situated on a rock surrounded with water, about a league from the city. The lazaretto of Castell-Nuovo, in Dalmatia, is on the shore, about two miles from the city; at the back of it there is a delightful hill, which belongs to a convent of friars. Persons in quarantine, after a few days, are allowed to walk there, and divert themselves with shooting, &c. In order to obtain the most complete and satisfactory information by performing the strictest quarantine, our author determined to go to Smyrna, and there to take his passage to Venice in a ship with a foul bill. He was thus enabled to give a particular account of his reception and accommodation in the new lazaretto of this city, which is chiefly assigned to Turks and soldiers, and the crews of those ships which have the plague on board; and this he thought to be the more necessary, as the rules and tariffs of the other lazarettos in Europe have been evidently formed from those established at Venice. The city of Venice has two lazarettos, appropriated to the expurgation of merchandise susceptible of infection, coming from suspected parts, and for the accommodation of passengers in performing quarantine; as also for the reception of persons and effects infected in the unhappy times of pestilence. The old lazaretto is two miles, and the new about five miles

distant from the city, both on little islands, separated from all communication, not only by broad canals surrounding them, but also by high walls; they are of large extent, being about 400 geometrical paces in circumference. Of these Mr. Howard has given a particular description, with an account of the regulations, and mode of government to which they are subject, and a plan of the old lazaretto. At Trieste there are two lazarettos; one new, but both clean, and a contrast to those which our author had seen at Venice. Of the new one he has given a plan. It is surrounded, at the distance of about 20 yards, by a double wall, within which are separate burying places for Roman Catholics, Greeks, and Protestants. Mr. Howard closes his account of the principal lazarettos in Europe, with the outlines of a proper lazaretto, and an engraved sketch of a plan for its construction. He has also subjoined, in minute detail, various pertinent remarks respecting quarantines and lazarettos in general; together with observations on the importance of a lazaretto in England, in its connection with the advantages which our commerce might derive from it. See "An Account of the principal Lazarettos in Europe, &c." by John Howard, F.R.A. Warrington 1789, 4to.

By 39 & 40 Geo. III. c. 80. § 23. is enacted, that if any found person shall enter any lazaret, he shall perform quarantine; and if he shall return from thence (unless duly licensed), or shall escape, or attempt to escape, he shall be guilty of felony without benefit of clergy. See QUARANTINE.

LAZARETTO, a name given to a hospital ship, which is for the reception of the sick, or persons supposed to be infectious. It is also the name of a place parted off at the fore part of the lower deck in some merchant ships, for the convenience of laying up the provisions, stores, &c. necessary for the voyage.

LAZAREVA, in *Geography*, a town of Russia, in the government of Irkutsk, on the Lena; 32 miles S.W. of Kirenk.

LAZARI MORBUS, a name given by some writers to the elephantiasis.

LAZARIA, in *Geography*, a town of Portugal, in the province of Beira; six miles S.E. of Lamego.

LAZAROLE, in *Botany*. See MEDLAR.

LAZARUS, St. or LAZARO, a military order, instituted at Jerusalem by the Christians of the West, when they became masters of the Holy Land; whose business was, to receive pilgrims under their care, guard them on the roads, and defend them from the insults of the Saracens.

Some say, this order was instituted in 1119.

The knights of this order, being driven out of the Holy Land in 1253, followed St. Lewis into France; who, in return for the services they had done him in the East, confirmed the donations made to them by his predecessors, put them into possession of several houses, commanderies, and hospitals, which he had built and endowed with ample privileges, and procured from Alexander IV. in 1255 a bull, confirming the order, and giving them permission to observe the rule of St. Augustine. In the year 1490, pope Innocent VIII. suppressed their order, and united them to the order of St. John of Jerusalem; but the bull issued for that purpose was not received in France. In 1572, pope Gregory XII. united those of the order in Italy with that of St. Maurice, (which see,) then newly instituted by Emanuel Philibert, duke of Savoy. And, in 1608, this order was united in France to that of our Lady of mount Carmel, which had been instituted by Henry IV., and it obtained some new advantages from Louis XIV. The knights of St. Lazarus, and those of our Lady of mount Carmel, are allowed to marry, and,

at the same time, to possess pensions charged upon ecclesiastical livings. The badge of this order is a cross (like that of Malta) of eight points, made of pure gold, edged with white enamel; the middle, or nucleus, of the cross is enamelled crimson, and on it is the image of the blessed virgin and child proper; the reverse has the middle enamelled green, on which is the figure of St. Lazarus; between the rays of the cross are four fleurs-de-lis, and on each of the points a small gold ball. The cross is fastened to a broad crimson ribbon, and is worn either on the breast or scarf-wife.

**LAZARUS**, *Fathers of St.*, called also *Lazarites*, a name given to certain regular clerks of a congregation instituted in France, in the seventeenth century, by M. Vincent.

They take the denomination from a house in the Faubourg St. Denis of Paris; they have a seminary in Paris, called the seminary *des bons enfans*. The vows they make are simple, and may be dispensed with on occasion.

**LAZICA**, in *Ancient Geography*, a country of Asia, S. of the Phasis, and N. of Armenia. This country was inhabited by a tribe of people called *Lazi*, who have to this day preserved their name, and are known among the Turks under the denomination of *Lazas*, and their country is called the country of the *Lazas*, or the province of *Trebizond*. In the time of Pliny, Arrian, and Ptolemy, the *Lazi* were a particular tribe on the northern skirts of *Colchos*. In the age of Justinian, they spread, or at least reigned, over the whole country. At present they have migrated along the coast towards *Trebizond*, and compose a rude sea-faring people, with a peculiar language. As the strength of the Roman empire was gradually impaired, the Romans stationed on the Phasis were gradually withdrawn or expelled about the beginning of the 2d century of the Christian era; and the tribe of the *Lazi*, whose posterity (as we have said) speak a foreign dialect, and inhabit the sea coast of *Trebizond*, imposed their name and dominion on the ancient kingdom of *Colchos*. Their independence, however, was soon invaded by a formidable neighbour, who had acquired, by arms and treaties, the sovereignty of *Iberia*. The dependent king of *Lazica* received his sceptre from the Persian monarch, and the successors of *Constantine* acquiesced in this injurious claim, which was proudly urged as a right of immemorial prescription. In the beginning of the sixth century (A.D. 522) their influence was restored by the introduction of Christianity. After the decease of his father, *Zathus* was exalted to the regal dignity by the favour of the great king; but the pious youth abhorred the ceremonies of the *Magi*, and sought, in the palace of *Constantinople*, an orthodox baptism, a noble wife, and the alliance of the emperor *Justin*. The king of *Lazica* was solemnly invested with the diadem, and his new patron soothed the jealousy of the Persian court, excusing the revolt of *Colchos*, by the venerable names of hospitality and religion. The common interest of both empires imposed on the *Colchians* the duty of guarding the passes of mount *Caucasus*, where a wall of 60 miles is now defended by the monthly service of the musqueteers of *Mingrelia*. But this honourable connection was soon corrupted by the avarice and ambition of the Romans. Degraded from the rank of allies, the *Lazi* were incessantly reminded, by words and actions, of their dependent state. At the distance of a day's journey beyond the *Aparus*, they beheld the rising fortresses of *Petra*, which commanded the maritime country to the south of the *Phasis*. Instead of being protected by the valour, *Colchos* was insulted by the licentiousness, of foreign mercenaries; the benefits of commerce were converted into base and vexatious monopoly; and *Gubazes*, the native prince, was reduced

to a pageant of royalty by the superior influence of the officers of *Justinian*. Disappointed in their expectations of Christian virtue, the indignant *Lazi* resented some confidence in the justice of an unbeliever, and after a private assurance that their ambassadors should not be delivered to the Romans, they publicly solicited the friendship of *Chosroes*. The sagacious monarch discerned the use and importance of *Colchos*, and meditated a plan of conquest. His ambition was fired by the hope of launching a Persian navy from the *Phasis*, of commanding the trade and navigation of the *Euxine* sea, of desolating the coast of *Pontus* and *Bithynia*, of distressing, perhaps of attacking, *Constantinople*, and of persuading the barbarians of *Europe* to second his arms and counsels against the common enemy of mankind. Accordingly he led his troops to the frontiers of *Iberia*; they were conducted by *Colchian* guides through the woods and along the precipices of mount *Caucasus*; and a narrow path was formed into a safe and spacious highway, for the march of cavalry and even of elephants. *Gubazes* laid his person and diadem at the foot of the king of *Persia*; his *Colchians* imitated the submission of their prince, and after the walls of *Petra* had been shaken, the Roman garrison prevented, by a capitulation, the impending fury of the last assault. But the *Lazi* soon discovered that their impatience had urged them to choose an evil more intolerable than the calamities which they strove to escape. The monopoly of salt and corn was effectually removed by the loss of those valuable commodities; the authority of a Roman legislator was succeeded by the pride of an oriental despot, who beheld, with equal disdain, the slaves whom he had exalted, and the kings whom he had humbled, before the footstool of his throne. The adoration of fire was introduced into *Colchos* by the zeal of the *Magi*; their intolerant spirit provoked the fervour of Christian people; and the prejudice of nature or education was wounded by the impious practice of exposing the dead bodies of their parents, on the summit of a lofty tower, to the crows and vultures of the air. The *Lazi* were also apprized that *Nushervan* had given secret orders for assassinating their king, for transplanting them into some distant land, and for fixing a faithful and warlike colony on the banks of the *Phasis*. In these circumstances the *Colchians*, apprized of the ruin that awaited them, solicited the clemency and succour of *Justinian*; who, from motives of policy, determined to expel the Persians from the coast of the *Euxine*. The siege of *Petra* (which see) was immediately undertaken. Thus commenced the *Colchian* or *Lazic* war, A.D. 549. Notwithstanding some splendid advantages obtained by the troops of *Justinian*, the Persians occupied the passes of *Siberia*; *Colchos* was enslaved by their forts and garrisons; they devoured the scanty sustenance of the people; and the prince of the *Lazi* fled into the mountains. At length, the prudence of *Chosroes* relinquished the prosecution of the *Colchian* war, under a persuasion that it is impossible to reduce, or at least to hold a distant country against the wishes and efforts of its inhabitants. The fidelity of *Gubazes* sustained trials of the most rigorous kind; he patiently endured the hardships of a savage life, and rejected, with disdain, the specious temptations of the Persian court. The king of the *Lazi* had been educated in the Christian religion; his mother was the daughter of a senator; he had served to years a silentary of the *Byzantine* palace; and the arrears of an unpaid salary were a motive of attachment and of complaint. The lieutenants of *Justinian* prejudiced the emperor against him; persuaded him that a second defection was meditated; an order was issued to send the king prisoner to *Constantinople*, and a treacherous clause was inserted in it, that he might be lawfully

fully killed in case of resistance; and Gubazes, without arms, or suspicion of danger, was stabbed in the security of a friendly interview. In the first moment of rage and despair, the Colchians would have sacrificed their country and religion to the gratification of revenge; but the counsel of the wiser men among them prevailed; and the emperor, anxious to avoid the imputation of so foul a murder, commissioned a judge of senatorial rank to enquire into the conduct and death of the king of the Lazis; and some satisfaction was granted to an injured people by the sentence and execution of the meaner criminals. After 20 years of destructive though feeble war, Chofros was persuaded to renounce his claim to the possession or sovereignty of Colchos and its dependent states. Gibbon's Decl. &c. of Rom. Emp. vol. vii. See COLCHIS, MINGRELIA, and TREBIZOND.

LAZISE, in *Geography*, a town of Italy, in the Veronese, on the E. bank of lake Garde, with a harbour, a custom-house, and a castle; five miles W. of Verona.

LAZIVRAD, in *Natural History*, one of the oldest names by which we find the lapis lazuli expressed in authors.

LAZULI LAPIS, or LAPIS LAZULI; *Azure Stone*, Jam.; *Lafuslein*, Wern.; *Lazulite* of Haüy and Delameth. (not of Werner); *Pierre d'Azur*, Broch.; *Lazulite outremere*, Brong.; *Lazurus orientalis*, Linn.

The colour of this mineral is azure blue, generally perfect, but also passing into Berlin blue and smalt blue, seldom into sky blue: some varieties shew a slight tint of greenish-blue.

It occurs generally massive, in rolled pieces and disseminated; also indistinctly crystallized. The regular crystal form mentioned by Lhermina, and other French mineralogists, is that of the garnet dodecahedron; but whether this be the primitive or a secondary form, or whether it belong at all to the real azure stone, is as yet undecided.

Its internal lustre is glistening and glimmering. Fracture uneven, fine-grained.

Fragments indeterminate angular, more or less sharp-edged, and slightly translucent on the edges.

It scratches glass, and is easily frangible.

Specific gravity of the Persian, (according to Brisson and Blumenbach), 2.771; 2.896, (Kirwan); of the Siberian 2.945, (Brisson).

It is infusible before the blowpipe; but at a still higher degree of heat its natural colour gives way to a bluish-grey, and it runs into a whitish enamel. Klaproth obtained a dark-coloured, semitransparent, glassy globule, covered with grains of iron. If previously calcined it forms a jelly with acids. This latter observation was first made by Marggraf, who, as early as the year 1788, published an analysis of the lapis lazuli, in which he shewed that its colour is by no means produced by copper; his analysis has been confirmed by Klaproth, who found also alumine as a constituent part, which had been overlooked by his celebrated predecessor. Its composition, as determined by Klaproth, is the following:

Silica	-	-	46
Alumine	-	-	14.50
Carbonate of lime	-	-	28
Gypsum	-	-	6.50
Oxyd of iron	-	-	3
Water	-	-	2
			100

100 Klapr. Beitr. i. p. 196.

The result of an analysis given by M. M. Clement and Deformes, differs from the preceding: they obtained

Silica	-	-	-	-	34
Alumine	-	-	-	-	33
Sulphur	-	-	-	-	3
Soda	-	-	-	-	22
Lofs	-	-	-	-	8
					100

They consider these constituents as essential, and look upon the 0.024 of lime, and the 0.015 of iron, which they have sometimes found, as accidental ingredients. These chemists have also observed some peculiarities in the characters of the earth, mentioned as pure silica in the above analysis. This discrepancy in the results of the analyses points out the necessity of submitting the lapis lazuli to new chemical examination, which may throw light on the nature of the matter that produces the vivid and intense colour of this substance.

But little is known respecting the geognostic situation of this mineral. We see it disseminated in, and mixed with, a fealy crystalline lime-stone; also with quartz, and nox frequently with iron pyrites. The Siberian azure stone (which is distinguished from that called the Persian by its less vivid colour) is said to be the production of a vein near the lake Baikal in Siberia, where it is accompanied with feldspar, garnets, and pyrites.

The finest azure-stone is found in China, Great Bucharia, and Siberia. The true lapis lazuli has not yet been found in Europe, except buried under the ruins of Rome. That mentioned by Tournefort, as occurring near Ergeron in Armenia, is probably a blue copper-ore; and that which, as Mr. Pennant states, is found in great quantities in the island of Hainan, in the Chinese sea, (whence it is sent to Canton, where they employ it in china painting,) may likewise turn out to be different from the true lapis lazuli.

M. Patrin was informed by a dealer in stones, whom he met at Ekaterineburg in Siberia, and who had been in Bucharia, that the lapis lazuli occurred there in granite; not in veins, but disseminated in all sorts of proportion: but that it was extremely rare to find masses, as thick as one's head, in which the blue generally predominated over the white and the grey. The blocks examined by Patrin had the appearance of being rolled: but he was informed they were taken from the quarry; and that their roundness was owing to their friction against each other in the carriage; though sometimes they were found by chance as boulders in torrents, and that these were of the most vivid blue.

According to Laxmann, who resided several years in Eastern Siberia, rolled pieces of lapis lazuli are found on the shore of the lake Baikal, in a kind of gulf to the southward, called the Koutouk; but he searched in vain for the mountains from which these blocks had been detached, and he could obtain no information on this subject from the Buret Tartars who inhabit that savage country. Patrin.

We have omitted mentioning Persia among the countries that furnish this valuable substance, because a traveller well versed in the study of precious stones denies its ever having been found there. "In the copper-mines of Persia," says Tavernier, "veins of lazur have been found; which colour is much used in the country for painting flowers on the ceilings and roofs of apartments. Before these were discovered, the Persians had no other lazur than the real kind which comes from Tartary, and is exceedingly dear. The Persian lazur is a sort of copper-ore, which, when pounded and sifted, forms a fine paint, which appears very bright and pleasant.

After this discovery, the Persians were no longer permitted to purchase the Tartarian lapis lazuli; and Mahomet Beg issued an order that painters should not use any but Persian blue. This prohibition, however, did not long continue: for the Persian pigment would not stand the effects of the atmosphere like the real kind, but, in the course of time, became dark and of a dismal colour. Sometimes it was full of scales, and would not adhere to the end of a soft hair brush; on which account it was soon neglected as a pigment, and the lapis lazuli of Tartary again introduced.

The lapis lazuli is susceptible of taking a good polish, and is therefore used for various ornamental and other purposes, such as the engraving of gems: (See GEMS.) The variety containing disseminated pyrites, which the ignorant frequently mistake for gold, is preferred for mosaics and other inlaid work, &c. Most profusely it was used for the last-mentioned purpose, in the magnificent marble palace which Catherine II. built at Petersburg for Orlov, her favourite, and which has some apartments completely lined with lapis lazuli brought from Great Bucharia.

Masses that contain much quartz are less esteemed by the lapidaries, and particularly by those who prepare from it the *ultramarine*, a beautiful blue colour, so called because it was originally brought from the trading towns of the Levant. See ULTRAMARINE.

Pliny distinctly describes the lapis lazuli, but as a variety of sapphire.

The lapis lazuli was formerly reckoned of some use in medicine: it was prepared by calcining and washing it several times; which done, it made an ingredient in the famous confection of alkermes.

The alchemical writers have given us processes for magisters, tinctures, and elixirs of lapis lazuli, but they are wholly out of use.

The method of making the Venetian counterfeit lapis lazuli is this; melt in a pot, in a glass-house furnace, equal quantities of the fairest lattimo, and the whitest crystalline glass; when this is in fusion, mix into it, by small parcels at a time, the blue smalt used by the painters; make frequent proofs of the colour, and when it is right let the whole stand twelve hours, and then work it. If the metal rise in the pot, put in a piece of leaf gold to keep it down. This makes a fine pale blue substance, representing the plain blue parts of the natural lapis lazuli. Neri's Art of Glass, p. 117.

A counterfeit lapis lazuli may be also made by fusing ten pounds of either of the compositions for hard glass (see *Colouring of Glass*) with an ounce and a half of zaffer, and half an ounce of magnesia, till a very deep transparent blue glass be produced. When the mass is cold, powder it, and mix with it three quarters of a pound of calcined bones, horn, or ivory, by grinding them together: then fuse this mixture with a moderate heat, till the ingredients are thoroughly incorporated, and form the melted mass into cakes by pouring it on a clean bright plate of copper or iron. In order to give it veins of gold, mix gold powder with an equal weight of calcined borax, and temper them with oil of spike: let the cakes be painted with this mixture with fresh veins as are desired, and then put into a furnace of a moderate heat.

LAZULITE, or LASULITE of Werner (not that of Haiüy, for which see the preceding article); *Azurite*, Jameson; *Siderite*, Tromsdorff.

Colour indigo blue, from which it passes into smalt blue. Is found massive, disseminated, and crystallized, as it would appear, in four-sided and six-sided prisms. Mr.

Bernhardi observed the same forms in the variety from Salzburg, but also the regular octahedron with truncated edges, passing into the regular rhomboidal dodecahedron. In general, the crystals are very indistinct and small; and they occur always imbedded.

It is glistening and shining, and of rather resinous lustre. Longitudinal fracture imperfectly foliated, cross fracture uneven. Fragments indifferently angular. Its hardness is inferior to that of common feldspar.

It is brittle, easily frangible, and not particularly heavy. The chemical characters of lazulite, which distinguish it from blue iron earth, are, according to Klaproth, first, its crumbling before the blowpipe into a whitish earthy mass; secondly, its giving a clear light wine yellow, glassy pearl, with borax, and a transparent white pearl with salt of phosphor; and, lastly, its not being operated upon either by acids, or caustic alkali.

Klaproth found the variety from Vorau, near Wienersdorf, Newstadt, in Stiria, to be composed of siliceous alumine, and iron, but could not, from the smallness of the quantity he operated upon, ascertain their proportions. An analysis of the same, by Heim, gave 0.65 alumine, and 0.30 iron.

Tromsdorff's analysis of the variety from Salzburg has given the following results:

Silex	-	-	10
Alumine	-	-	66
Magnesia	-	-	18
Lime	-	-	2
Oxyd of iron	-	-	2.5
Loss	-	-	1.5

100 Gehlen's Journal.

Mr. Tromsdorff thinks that alumine and magnesia must be considered as the essential parts of this mineral substance; hence Mr. Bernhardi is inclined to refer it to the spinelle ruby, with which Haiüy has already united the ceylanite, or pleonast, and which the lazulite resembles also with respect to its crystallization. But is not the hardness of the latter much inferior to that of spinelle?

To the above two localities where the lazulite has been found, we may add that of Krieglach; for, indeed, the substance known by the name of *blue feldspar of Krieglach* appears to agree in all its characters with those of Stiria and Salzburg. In all these places it is found in, and grown together with, white quartz, imbedded in a kind of mica slate.

LAZZI, a denomination given by the Saxons to that rank of people who were born to labour, and being of a more servile state than our servants, because they could not depart from their service without leave of the lord, but were fixed to the land where born and in the nature of slaves: hence the word *lazzi*, or *lazy*, signifies those of a servile condition. See EDHLING.

LE roy le oust, } See LE ROY.

LE roy s'advijera, }

LEA, in *Ancient Geography*, a small island of the Ægean sea. Pliny.

LEA, in *Geography*, a river of England, which rises in Bedfordshire, passes by Hertford, Ware, &c. and falls into the Thames a little below London.

LEA of Yarn, is used in some parts of England for a certain quantity of yarn. On a kilderminster it ought to contain two hundred threads, on a reel four yards about. Stat. 22 & 23 Car. II.

**LEACH-BRINE**, a word used by the English salt-workers to express the brine which runs out from the salt, when it stands in the basket to drain, immediately after being taken out of the pan; and also the liquor left in the pan, when no more salt will float. This is also called the *mother-brine*, and *bittern*. In the German salt-works they always throw this liquor away. In our brine-salt works in Cheshire they always preserve it, and add it to the next boiling; and in the Newcastle, and other sea-water salt-works, they save it for the making the bitter purging salt, called *Epsom salt*.

**LEAD**, in *Mineralogy*, *Plumbum*, Lat.; *Plomb*, Fr.; *Bly*, Germ.; *Saturnus*, Alchem. The colour of lead is of a blueish-white; when tarnished, it becomes yellowish-white, then blueish, and at last blueish black. Lustre, when untarnished, 3; hardness, 5; and specific gravity somewhere between 11 and 12. According to Brisson, it was 11.352; and a specimen tried by Gellert, which was found at Freyburg, was estimated at 11.445. Next to gold, platinum, and mercury, it is the heaviest metal, being upwards of eleven times heavier than an equal bulk of water. (See *SPECIFIC GRAVITY*.) The heaviest is reckoned the best. It stains paper and the fingers. Next to tin, it is the most fusible of all the metals. It is soluble in most of the acids, though more readily so in the nitrous diluted than the others. By exposure to the moist atmosphere, it rusts or oxyds. It is malleable, and unelastic, and its oxyd is easily fusible into a transparent yellow glass. Having given this general description, we shall now consider the several combinations under which it is found in nature.

*Ores of Lead.*

Sp. 1. *Lead Glance*. *Bleiglanz*. This species contains two subspecies: (1) *Common lead-glance*, the colour of which is of a lead-grey, of different kinds of intensity; in some varieties it inclines to a blackish cast. The lead-grey

frequently contains the greatest proportion of silver. It sometimes presents superficially an iridescent tarnish. It occurs massive, disseminated, in membranes, in angular pieces, and in grains: sometimes it is met with reticulated, specular, corroded, and amorphous; seldom cylindrical, but often crystallized. The crystalline form exhibits several varieties: 1, in the shape of a cube, in which the planes are either straight or spherical convex; 2, the cube having angles more or less deeply truncated; 3, the cube having its edges and angles truncated at the same time, but of these the latter the most deeply; 4, octahedron, either perfect or truncated on all its angles; 5, octahedron having its angles and edges truncated at the same time; 6, rectangular four-sided prisms, acuminate on both extremities by four planes, which are set on lateral edges; 7, six-sided prisms, acuminate by four planes; 8, three-sided tables, in which the terminal planes are bevelled. The crystals are usually small, or at most middle-sized, either grouped on one another, implanted, or solitary. The planes of the crystals are sometimes smooth, sometimes drusy, and sometimes rough. Internally it alternates from specular splendid to glittering; on the external surface it is less bright, but its lustre is metallic. Its fracture is more or less perfect foliated, and its fragments are cubical. In mass it is often composed of granular, and rarely of lamellar distinct concretions, which are much grown together, and whose fracture has a radiated aspect. It is soft, perfectly sectile, easily frangible, and the specific gravity is from 6.2 to 7.8 nearly. Before the blowpipe it flies to pieces, and emits a sulphureous odour. It is easily fusible, and may be readily reduced on coal before the blowpipe. When it is alternately heated and cooled, it at length disappears entirely; and if it contain silver, a globe of that metal remains behind. According to Vauquelin, lead-glance contains the following ingredients:

	From Kirchwald, in Deux Ponts.	Kampfflein.	Eckberg.	Kantenbach.	Cologne.
Lead - - -	54	69	68.69	64	63.1
Sulphur - - -	8	16	16.18	18	12.
Carbonated lime and silicx	38	15	16.13	18	19.67
Oxyd of iron - - -	0	0	0	0	3.33
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	100	100	101	100	98.1

Dr. Thomson gives the following as the result of his experiments:

Lead - - -	85.13
Sulphur - - -	13.02
Oxyd of iron - - -	0.5
	<hr/>
	98.65
Loss - - -	1.35
	<hr/>
	100

Hence, as is evident from the above tables, the proportion of lead varies from 54 to rather more than 85 per cent. The proportion of silver varies considerably also; and it appears to have an effect on the external aspect of the varieties. It sometimes also contains a small portion of iron; and gold has even been found in lead-glance. It is, next to pyrites, the most common of metallic ores, and is found in beds and veins in primitive, transition, and secondary mountains. It occurs almost always with blende and calamine, with which it appears to have a strong geognostic affinity. It is frequently

accompanied with silver ores, and sometimes with copper ores. To mention all the places in which it is found, would be to mention almost all the known mineral districts in the world. It is very abundant in Germany, and also in many places in our own country. The lead-mines in Britain are situated in Cornwall, Devonshire, and Somersetshire, in Derbyshire, Durham, Lancashire, Cumberland, and Westmoreland; in Shropshire, in Flintshire, Denbighshire, Merionethshire, and Montgomeryshire; at the lead-hills in Scotland, on the borders of Dumfriesshire and Lanarkshire, in Ayrshire, and at Strontian in Argyleshire. Lead-glance is also found at Konigsberg in Norway; in various parts of Lapland, and in Denmark and Sweden; in several districts of Saxony, Hungary, Transylvania; in France, Italy, and Spain. Most of the lead of commerce is procured from this ore; it is also used without farther preparation in the potteries for coarse work, and also in the smelting of silver ores. Lead-glance is now generally used as a scientific name, in preference to the less significant but common one *galena*, on account of its lustre, which forms a striking feature in the external aspect of this mineral. (2) The second subspecies

is *compact lead-glance*. The colour of this is very similar to that of the common lead-glance. It occurs in mafs, diffe-minated, and fpecular. The latter is externally fmoother, fhining, and fplendent; internally it is glimmering, and its luftre is metallic. Its fracture is even. It acquires a polifh by friction; its ftrcak is fhining, almofl fplendent; not fo eafily frangible as the preceding fubfpecies; but agrees with it in the other characters. Its fpecific gravity is about 7.4. It occurs in veins, and is ufually accompanied with the common lead-glance. When the two fubfpecies occur together, the compact always forms the fides of the vein, and this probably owing to its having been in a lefs perfect ftate of folution. It is accompanied with black blende, common iron pyrites, copper pyrites, quartz, and heavy fpar. It is found in the lead-hills in Lanarkfhire, and in Derbyfhire; in divers parts of Germany, and in the valley of Chamouni in Switzerland.

Sp. 2. *Blue lead ore. Blaubl-yerz*, Wern. *Mine de plomb bleu*, Broch. The colour of this fpecies is intermediate between dark indigo blue and lead-grey. It occurs mafive, and cryftallized in perfect fix-fided prifms, which are ufually fmall, low, fometimes bulging, with a furface rough and dull. Internally it is feebly glimmering, and its luftre is metallic. The fracture is even, paffing into the fine-grained uneven and flat conchoidal. Its fragments are indetermi-nately angular. It is opaque, gives a fhining metallic ftrcak, is foft, fertile, and eafily frangible. Its fpecific gravity is 5.46. It eafily melts before the blowpipe, burns with a weak blue flame, emits a ftrong fulphureous vapour, and is reduced to pure lead. It is conjectured to be a compound of lead, oxyd of lead, and fulphur; and is fuppofed by Werner to be intermediate between lead-glance and black lead ore. Klaproth difcovered in it phosphoric acid. It occurs in veins, accompanied with black lead ore, white lead ore, malachite, radiated copper azure quartz, fluor-fpar, and heavy fpar. It is not often to be met with, and has hitherto been found only at Zfchoppau in Saxony, at Schemnitz in Hungary, and Brittany in France.

Sp. 3. *Brown lead ore. Braun vleyerz*, Wern. *La mine de plomb brune*, Broch. Its colour is hair-brown, of different degrees of intensity, fometimes very pale, approaching to grey, and fometimes it paffes into a clove-brown. It occurs mafive, and is cryftallized in fix-fided prifms. The furface of the cryftals is blackifh and rough. Internally it is glitening, and its luftre is refinous. The fracture is fmall and fine-grained uneven, and fometimes paffes into fplintery. It is foft, not very brittle, but eafily frangible. Its fpecific gravity between 6.60 and 6.98. It melts eafily before the blowpipe, without being reduced; and, during the cooling, fhoots into acicular cryftals. It does not effervefce with acids. According to Klaproth, a fpecimen from Brittany contained,

Oxyd of lead	- -	78.58
Phofphoric acid	- -	19.73
Muriatic acid	- -	1.65
		<hr/>
Lofs	- - -	99.96
		4
		<hr/>
		100
		<hr/>

It is found at Miefs in Bohemia; alfo in parts of Hungary, Saxony, and Lower Brittany. In Bohemia it is ufually found accompanied with lead-glance, white, black, and green lead ores, copper pyrites, blende, quartz, heavy fpar, &c. It occurs in veins.

Sp. 4. *Black lead ore. Schwarz vleyerz*, Wern. *La mine de plomb-noir*, Broch. The colour of this fpecies is greyifh-black, of different degrees of intensity. It occurs in mafs, diffe-minated or cellular, or cryftallized in fix-fided prifms. It is externally fplendent, and internally only fhining. Fracture fmall-grained uneven, which fometimes paffes into imperfect conchoidal and fplintery. Fragments undeterminately angular; ftrcak greyifh white; rather brittle; eafily frangible. Specific gravity about 5.8. Before the blowpipe it decrepitates, and is quickly reduced to a metallic globule. According to Lampadius it confifts of,

Lead	- - -	72
Oxygen	- - -	7
Carbonic acid	- - -	18
Carbon	- - -	2
		<hr/>

Lofs	- - -	99
		1
		<hr/>
		100
		<hr/>

It occurs in veins, and is almofl always accompanied with white lead ore and lead-glance, and ufually in the upper part of veins, and in new lead-glance formations. It very frequently encrufts lead-glance, and is covered with white lead ore, and fometimes by green lead ore. It is found in the lead-hills of Scotland; in different parts of Bohemia, Saxony, Salzburg, Lower Brittany, and in Siberia. Previously to the analysis of Lampadius, Haiÿ fuppofed it was a phofphate of lead; and Werner fufpected that it was a compound of lead, carbonic, and fulphuric acids.

Sp. 5. *White lead ore. Wies-vleyerz*, Wern. *Mine de plomb blanche*, Broch. This is a carbonate of lead: its colour is a greyifh or yellowifh-white, with very many different fhades. It occurs mafive, diffe-minated, but moft frequently in a cryftallized ftate. The chief varieties are, 1, the cucuiform octahedron; 2, the pyramidal dodecahedron; 3, the preceding, with a fix-fided prifm interpofed between the pyramids; 4, the fame as variety 3, with fummits of the terminal pyramids replaced by a fix-fided plane; 5, a fix-fided prifm, with fummits compofed of four planes; 6, the fame, with fummits compofed of fix planes. The cryftals are ufually fmall. Externally, it is fpecular fplendent, feldom glitening; internally, it alternates from highly fplendent to glitening, and its luftre is adamantine, inclining fometimes to femi-metallic, and fometimes to refinous. The fracture is commonly fmall conchoidal, but it frequently paffes into fine-grained uneven, and even into fine fplintery. Fragments indetermi-nately angular. It alternates from tranf-lucent to tranfparent, and is duplicating. It is foft, brittle, and eafily frangible. Its fpecific gravity is from 6 to 7.24, according to the different fpecimens that have been analyzed. Before the blowpipe it flies to pieces, becomes red, yellow, and laftly melts into a globule of metallic lead. It makes a ftrong effervefce with acids. Its furface becomes black, when expofed to the vapour of fulphuret of ammonia. Its conftituent parts are as follow:

From Siberia, analyfed by Macquer.		From the Lead-hills in Sotland, analyfed by Klaproth.	
Lead	- - 67	Lead	- - 77
Carbonic acid	- 24	Carbonic acid	- 16
Oxygen	- 6	Oxygen	- 5
Water	- 3	Water	- 2
	<hr/>		<hr/>
	100		100
	<hr/>		<hr/>

# L E A D.

But according to two other able chemists, they are as follow :

From Zellerfeld.			From Ildekanfcoi.		
	First Analysis.	Second Analysis.		First Analysis.	Second Analysis.
Lead	- - 81.2	80.25	Lead	- - 74.0	77.50
Carbonic acid	- 16.	16.0	Carbonic acid	- 15.0	15.0
Oxyd of iron	- 0.3	0.18	Oxyd of iron	- 0.25	1.25
Alumine	- - 0.0	0.75	Alumine	- - 1.0	0.0
Lime	- - 0.9	0.50	Lime	- - 1.0	0.0
			Silica	- - 0.25	0.50
			Water	- - 4.0	0.0
Lofs	- - 98.4	97.68	Lofs	- - 95.50	94.25
	- - 1.6	2.32		- - 4.5	5.75
	100	100		100	100

It is almost always accompanied with lead-glance, and occurs in a kind of repository. It occurs in veins that traverse transition rocks; though it is found with different minerals, in different parts of the world. It is not a rare mineral, but is seldom found in sufficient quantities to make it worth while to separate it from the adhering spar, for the purpose of melting. The finest specimens of this ore that are found in Britain come from the mines of Derbyshire, the Lead-hills in Scotland, and Minera in Denbighshire. It is also found on many parts of the continent.

Sp. 6. *Green lead-ore.* Grün Bleyerz, Wern. *La mine de plomb verte*, Broch. The colour of this species is grass-green, which passes on through the several shades into greenish-white. The olive and pistachio-green colours are the most common. It occurs massive, sometimes reniform, but most commonly crystallized. The varieties are, 1. Six-sided prisms, having sometimes the lateral and terminal edges truncated. 2. When the lateral edges of the prism converge towards their extremities, an acute, double, six-sided pyramid is formed. The crystals are small; externally smooth and shining; internally glistening; the lustre is resinous. Fracture small-grained, uneven. Fragments angular and blunt-edged: it is soft, rather brittle, and easily frangible. Specific gravity 6.27 to 6.94. Before the blowpipe it does not fly to pieces; it becomes white and melts easily into a greyish-globule, but without being reduced even with charcoal. It dissolves in acids without effervescence. Its constituent parts are, according to

Fourcroy	
Oxyd of lead	- 79
Phosphoric acid	- 18
Oxyd of iron	- 1
Water	- 2
	100

Vauquelin	
Lead	- 45.18
Phosphoric acid	- 13.17
Oxygen	- 4.05
Silica	- 32.
	99.40
Lofs	- 60
	100

Green lead-ore is, when of a pale colour, apt to be confounded with the preceding species; but it may be distin-

guished by the following characteristics: 1. The fracture in this species is fine-grained, uneven, but in white lead-ore it is more or less conchoidal. 2. Its lustre is resinous. 3. It is harder than white lead-ore. 4. It is of a greater specific gravity. 5. Its crystals are often aggregated; and 6. Its prisms are generally shorter than those of white lead-ore.

Sp. 7. *Red lead ore.* Roth Bleyerz, Werner. *Red lead-spar*, Kirwan. *La mine de plomb rouge*, Brochant. The colour of this mineral is of a hyacinth-red, sometimes inclining to aurora, or morning red. It occurs most commonly crystallized in broad four-sided prisms, and but rarely massive, disseminated, or in membranes. The crystals are middle-sized: the surface of the crystals is usually smooth, sometimes longitudinally streaked. Both externally and internally it is splendid, and its lustre is intermediate between adamantine and resinous. The fracture is foliated, and the fragments indeterminate angular. It sometimes inclines to transparency. It is soft, and in the intermediate state between very brittle and sectile: easily frangible, and its specific gravity is somewhere between 5.6 and 6.0. It melts before the blowpipe into a blackish scoria, and may be partly reduced with borax. Specimens have been analysed by

Vauquelin		Thenard	
Lead	- 57.10	Oxyd of lead	- 64
Oxygen	- 6.86	Chromic acid	- 36
Chromic acid	- 36.04		
	100		100

This mineral occurs in veins in gneiss and mica slate, where it is accompanied with lead-glance, green lead-ore, iron pyrites, brown iron-stone, native gold and quartz. It is found in Siberia; at Annaberg, in Austria; and at Upper Faucigny, in Savoy. It is much used as a pigment, on account of its beautiful colour, its durability in the atmosphere, and its mixing readily with oil.

Sp. 8. *Yellow lead-ore.* Gelbes Bleyerz, Werner. *Yellow lead-spar*, Kirwan and Hatchett. *Plomb molybdaté*, Haüy. *La mine de plomb jaune*, Brochant. In this species, which has long been known to mineralogists, the lead is mineralized by a particular metallic acid, called the molybdic acid. It occurs sometimes massive, more commonly crystallized in small crystals; the forms of which are rectangular tables of four sides, or of eight sides, bevelled; the cube, octahedron, equiangular eight-sided table, and double eight-sided pyramid. The tables are usually broad and thin, and alternate from small to very small, but are seldom middle-sized.

They

They are sometimes united, frequently intersect one another, and form thus the cellular external shape. Its colour is wax-yellow, and its lustre distinctly waxy: it is translucent, soft, and easily frangible. Its specific gravity is rather more than 5. It decrepitates before the blowpipe, then melts into a globule of a grey colour, in which are disseminated particles of metallic lead. It gives a bluish-white colour to borax: it occasionally produces a glass, which is greenish-blue, and sometimes deep blue. Its constituent parts are, according to

Klaproth's Analysis		Hatchett's Analysis	
Oxyd of lead	64.42	Oxyd of lead	58.40
Oxyd of molybdena	34.25	Molybdic acid	38.0
		Oxyd of iron	2.08
	98.67	Silica	0.28
Lofs	1.33		
	100	Lofs	98.76
			1.24
			100

Macquart's Analysis

Lead	-	58.75
Molybdena	-	28.0
Oxygen	-	4.76
Carbonate of lime	-	4.50
Silica	-	4.
		100.01

It occurs on compact lime-stone which is much traversed by veins of calc-spar, and is accompanied with molybdena and yellow lead-earth; sometimes, also, with lead-glance, white, black, and green lead-ore, calamine, blende, the calc and fluor spars. It is found principally in Carinthia; though it is met with at Annaberg, in Austria; also in Hungary, Silesia, Saxony, Burgundy, in France, and other places.

Sp. 9. *Lead vitriol, or sulphate of lead. Blei vitriol*, Werner. *Native vitriol of lead*, Kirw. *Plomb sulphaté*, Haüy. *Le vitriol de plomb natif*, Broch. The colour of this mineral is yellowish grey, passing to the greyish-white; the lighter varieties incline much to white. It occurs only in crystals, the form of which is rectangular octahedrons with obtuse pyramids. The pyramids are often variously truncated. Externally it is shining; internally it is splendent. The fracture is compact; it is more or less transparent: it is softish, rather brittle, and its specific gravity is about 6.3. It is easily reduced, when exposed to the flame of the blowpipe; and is insoluble in the nitrous acid. Specimens have been analysed by Klaproth; the constituent parts are as follow: viz. of that from

	Anglesea	Wanlock-head
Oxyd of lead	71	70.50
Sulphuric acid	24.8	25.75
Water of crystallization	2	2.25
Oxyd of iron	1	
	98.8	98.50
Lofs	1.2	1.5
	100.	100.

It occurs in lead-glance veins at Wanlock-head, and in brown iron-stone in the island of Anglesea. It has also been found in lead-glance veins in Andalusia in Spain.

Sp. 10. *Lead-earth. Bleyerde*, Wern. is divided into two

sub-species; 1, the coherent; and 2, the friable. 1. The coherent, or indurated, named *Verhärtete bleierde* by Werner, and *Le plomb endurci* by Brochant, is of a yellowish or greenish-grey colour. It is sometimes of a smoky-grey, and sometimes of a light brownish-red. It occurs in mass. Internally it is glittering, passing into glistening, and its lustre is resinous. Its fracture is fine-grained, uneven, passing into fine splintery and earthy, also into flat conchoidal. It is opaque, or, at most, slightly translucent on the edges. It gives a brownish streak, is soft, passing into friable, not brittle, but inclining to sectile, and heavy. It is easily reduced before the blowpipe, effervesces with acids, and becomes black with sulphuret of ammonia. It does not appear to have been hitherto analysed, but is supposed to be in intimate combination with white lead ore, alumine, and lime. It occurs with the other ores of lead, and is usually accompanied by iron pyrites, malachite, and quartz. The yellow varieties are found in Derbyshire, in some parts of Germany, at La Croix in France, and at Tschefink in Siberia. The other varieties are to be met with at Wanlock-head, in the Lead-hills in Scotland, in Saxony, Silesia, Poland, &c. 2. *Friable lead-earth. Zerrübbliche bleierde*, Werner. *Le plomb terreux friable*, Brochant, is of a yellowish-grey, approaching to sulphur-yellow. It occurs friable; sometimes massive and disseminated. It is composed of dull dusty particles, which are more or less cohering, and soil a little. It has a rough feel, and is heavy. It occurs on the surface, or in the hollows of other minerals, and is usually accompanied with lead-glance, and other ores of lead, and is found at Wanlock-head, and the Lead-hills of Scotland, at Zellerfeld in the Hartz, near Freyberg, in the electorate of Saxony, in the mountains of Cracow, Poland, at La Croix in France, and at Berefowskoï in Siberia. It is in some instances observed passing into solid lead-earth, and is probably formed by the decomposition of lead-glance, as it is frequently met with as a crust upon it.

Sp. 11. Another species is denominated a triple sulphuret of lead. Its colour is dark-grey inclining to black. It occurs crystallized. Its primitive figure is a rectangular tetrahedral prism, besides which it presents the following varieties. 1. The primitive crystal with solid angles replaced by triangular planes. 2. The same with lateral edges replaced by rectangular planes. 3. The same terminated by a very low and deeply truncated tetrahedral pyramid. 4. Four prisms with deeply truncated dihedral summits joined together at their bases, forming a rectangular cross. The crystals are large and middle-sized, with a splendent metallic lustre both externally and internally. Its fracture is coarse-grained and uneven. It is brittle and easily frangible. It leaves a faint black trace when rubbed on paper. Specific gravity 5.8 nearly. When suddenly heated before the blowpipe it crackles and splits; but if gradually heated it melts, and on cooling forms a globule of a dull metallic grey colour. According to an analysis made by Mr. Hatchett, it consists of

Sulphur	-	-	17
Lead	-	-	42.62
Antimony	-	-	24.23
Copper	-	-	12.8
Iron	-	-	1.2
			97.85
Lofs	-	-	2.15
			100

It is found in a mine at Huel-Boys in Cornwall.

The existence of native lead, which has been maintained by several mineralogists, is extremely doubtful. What has been regarded as a native oxyd of the metal, appears to be rather an earthy carbonate.

*Affay and Analysis of Lead Ores.*—The most common lead ore, galena, is very easily analysed, since it is in general composed of sulphur and lead only. Those ores in which the lead is combined with other metals, such as silver, copper, antimony, bismuth, or arsenic, are attended with more difficulty in their analysis. If the analysis be made with a view to smelt the ore, it will be proper to make the affay in the dry, as well as the humid way. The latter will not only give the proportion of lead, but its other constituents, by which the smelter is directed to use the most proper fluxes. When, however, the analysis is made for publication, it should be made by the humid process only, and with the greatest accuracy.

The common galena may be analysed by dissolving 100 grains in dilute nitric acid: the lead will be dissolved, and the residuum will be sulphur, which may be separated by washing. The solution of lead may now be treated with sulphat of soda. The lead will be precipitated, with the sulphuric acid in the state of sulphat of lead. The precipitate being collected, and dried at the temperature of 212, must be weighed, allowing for every 100 grains of the sulphat 69.85 of lead. The lead may be precipitated from the nitric acid, in the metallic, by means of a plate of zinc. The metallic lead will adhere to the plate, and may be scraped off and squeezed into lumps, after being washed in clean water. The lead obtained by this process is supposed to contain a small portion of the zinc. It will, therefore, be proper to digest the metallic precipitate, for a short time, in very dilute sulphuric acid, and then wash the lead with warm distilled water.

A specimen of galena containing silver was analysed by Vauquelin.

By slowly roasting a portion of this ore, he found it lost 12 per cent. of sulphur. Another portion was treated with dilute nitric acid, which dissolved the lead. The residuum was heated to redness, by which the sulphur was volatilized, leaving behind 16.75 of sulphur. To the solution in nitric acid was now added sulphat of soda, when the lead was precipitated in the state of sulphat. He obtained 63.1 per cent. of lead, allowing 100 of sulphat to contain 75.72 of metallic lead. He then saturated the liquor with ammonia, which threw down 3.3 per cent. of oxyd of iron, and obtained from the remaining liquor, by carbonat of potash, 5 per cent. of carbonat of lime.

A specimen of lead ore from Cornwall, consisting of lead, sulphur, antimony, and copper, was analysed by Mr. Hatchet.

To 200 grains of the ore, in a matrass, he added 2 oz. of muriatic acid. While the mixture was heated, he added, from time to time, small quantities of nitric acid, just to keep up an effervescence, till the metals were oxydated and dissolved. After being gently heated for an hour, the solution was complete, and of a green colour, owing to the presence of the copper. The sulphur was separated and floated on the liquid, which being collected was digested in muriatic acid. When dried it weighed 34 grains.

The above solution, and the muriatic acid in which the sulphur was digested, were mixed together, and diluted with six pints of distilled water. The mixture became turbid and milky, and on being filtered while hot, the pure oxyd of antimony was left on the filter, which being washed with more boiling water, was dried, and found to weigh 63 grains.

When the liquid, which had passed through the filter, including the washings, was cold, some muriat of lead was deposited in crystals, owing to the sparing solubility of that

salt. The whole was evaporated to a small quantity of liquid, sufficient to hold the copper in solution. This liquid, being separated from the solid muriat of lead, contained a small portion of that salt. A few drops of sulphuric acid being added, however, separated it in the state of sulphat of lead. The mass of muriat of lead left by evaporation, was now re-dissolved in boiling water, and decomposed by sulphat of soda. The sulphat of lead here formed was added to that produced from the separated liquid, which, on being washed and dried on a sand bath, weighed 120.2 grains. The green liquid containing the remainder of the mineral was now saturated with ammonia and an excess added, which redissolved the oxyd of copper, forming a vivid blue solution. A quantity of oxyd of iron now subsided, which, when separated, weighed 2.4 grains.

The solution of copper was now evaporated nearly to dryness, and boiled with pure potash, when the black oxyd of copper was left at the bottom of the vessel, which being washed, separated, and dried, weighed 32 grains.

In this analysis the sulphur is the only substance separated in a state of purity. The 63 grains of oxyd of antimony, allowing it to contain 23.08 per cent. of oxygen, would afford 48.46 of antimony. The 120.2 grains of sulphat of lead, allowing 70.9 to the 100, will give 85.22 of metallic lead. The 32 grains of oxyd of copper, reckoning the black oxyd of that metal to contain 25 in the 100, will yield 24 grains. If we reckon the 2.4 grains of iron at 1.2 of metal, the analysis will stand as follows, when reduced to 100.

Sulphur	-	-	-	17
Antimony	-	-	-	24.46
Lead	-	-	-	42.61
Copper	-	-	-	12
Iron	-	-	-	1.2
				<hr/>
				97.77
Loss	-	-	-	2.73
				<hr/>
				100
				<hr/>

If silver had been a constituent of the ore, the above process would have been a little varied. In the first operation the ore would have been dissolved in dilute nitric acid, the antimony would have been in part dissolved, and left at the bottom of the vessel in the state of white oxyd. When the sulphur and the antimony, by dilution with water, are separated, muriatic acid must be added. The lead will be in part, and the silver entirely precipitated. The muriat of lead may be separated, by boiling water, from the muriat of silver. The weight of silver may be rated at 77.52 in the 100 of muriat. The other metals may be separated as in the last process. Arseniated lead ore requires a still different treatment. It was analysed by Vauquelin as follows: 100 parts of ore were roasted for half an hour, occasionally adding a little tallow, which served to reduce the arsenic and facilitate its escape. By this treatment it lost 38 parts, which was presumed to be oxyd of arsenic; the remaining mass was boiled with strong muriatic acid for an hour. A quantity of oxy muriatic acid escaped, the liquid assumed a red colour, and white needle-formed crystals of muriat of lead were deposited. The lead by this means was converted into a muriat, which being dissolved in boiling water, and treated with sulphat of soda, affords sulphur of lead. This precipitate, being separated and dried, weighed 25 parts, which gave 20.2 of lead, allowing 80.8 to the 100 of sulphat. The liquid thus freed from lead being treated with pure ammonia, afforded a precipitate equal to 39 grains, consisting of oxyds of iron and arsenic. The circumstance of oxy muriatic acid being given out, when the oxyd of lead was digested

gested with muriatic, induced Vauquelin to conclude that it was in a state of peroxyd.

In this account the last part of the process appears incomplete, in the circumstance of the oxyds of arsenic and iron being mixed together. The former of these may be separated, boiling the two in nitromuriatic acid, which will convert the oxyd of arsenic into arsenic acid, and which may be separated by washing.

Carbonat of lead was analysed by Klaproth by the following process. He introduced 100 grains of this ore into 200 grains of nitric acid, and diluted it with 300 of water. The carbonic acid escaped in the form of gas, making a loss of weight equal to 16 grains. Into this solution was suspended a cylinder of zinc. In 24 hours the lead was precipitated in the metallic state, which weighed 77 grains, equal to 82 of oxyd.

Sulphat of lead has been analysed by the same chemist: 100 grains of the ore were first roasted at a red heat, and lost two grains, supposed to be water. The remainder was then heated to redness in a platina crucible, with 400 grains of carbonat of potash. By this treatment a yellow reddish mass was obtained, which, on being digested in water and filtered, afforded 72 grains of oxyd of lead. This was next dissolved in nitric acid, leaving a residuum of one grain of oxyd of iron. A cylinder of zinc was introduced into the solution, which precipitated the lead in the metallic form, in quantity equal to 66½ grains.

The alkaline matter which passed through the filter contained the sulphuric acid of the sulphat of lead, with excess of alkali; this excess was saturated with nitric acid, and the liquid acetat of barytes was added, which caused a precipitation of 73 grains of sulphat of barytes; this he allows to contain 25 grains of real sulphuric acid. Hence the result is

Oxyd of lead	72
Sulphuric acid	25
Oxyd of iron	1
Loss by roasting	2
	<hr/>
	100

We have also the analysis of phosphat of lead by the same ingenious experimenter.

One hundred grains of this native salt were dissolved in dilute nitric acid; into this solution nitrat of silver was dropped till it ceased to precipitate: the insoluble substance, which was muriat of silver, weighed 11 grains, indicating 17 grains of muriatic acid. Sulphuric acid was now added to precipitate the lead. The sulphat of lead weighed 106 grains, which contained 78.4 of oxyd of lead. The excess of sulphuric acid was separated by adding nitrat of barytes, and then nearly neutralized with ammonia. On adding acetat of lead, 82 grains of phosphat of lead were precipitated, containing 18.37 of phosphoric acid: muriatic acid was now added to the solution, and evaporated to dryness. The dry mass was digested with alcohol, which dissolved the muriat of iron, the presence of which was detected by prussiat of potash, and was found equal to 1/19th of a grain of the oxyd.

Molybdat of lead was analysed by Mr. Hatchett. He boiled a quantity of the ore in sulphuric acid, till it would dissolve no more. This formed sulphat of lead, while the molybdic acid was dissolved in the sulphuric acid. The sulphat of lead was boiled with carbonat of soda, and was afterwards washed: this appeared to be carbonat of lead. The nitric acid dissolved all but a small quantity, which was added to be flux. The lead was next precipitated by sulphuric acid. The solution of the molybdic acid in the sul-

phuric acid was diluted with 16 parts of water, and saturated with ammonia; when a little oxyd of iron was precipitated. The solution was now evaporated to dryness, and a strong heat given to sublime the sulphat of ammonia. The remaining mass, when boiled with nitric acid to dryness, afforded molybdic acid of a yellow colour.

Although the analysis of the different ores may have pointed out general methods for the separation of lead from other metals, some hints may, nevertheless, be necessary for the analysis of the alloys of lead. Lead is most frequently alloyed with tin, silver, antimony, or bismuth. The alloy of tin and lead may be dissolved in dilute nitric acid. The lead will be entirely taken up. Mott of the tin will be precipitated in the state of white oxyd, by the addition of water. If sulphuric acid be now dropped into the solution till the precipitation ceases, the lead, in a state of sulphat, will be obtained, while the remaining tin will be dissolved, which may afterwards be precipitated by an alkali. Lead may be separated from silver, when both those bodies are dissolved in pure nitric acid. The silver may be precipitated in the state of muriat, by adding muriat of soda. The lead may be afterwards precipitated by sulphuric acid.

To separate lead from bismuth, dissolve the alloy in nitric acid, then add a large quantity of water, which will precipitate the greatest part of the bismuth in the state of white oxyd. The lead must then be precipitated by sulphat of soda, and the remainder of the bismuth by potash.

The separation of lead from antimony may be performed by the same process used for separating tin.

It may be here noticed, that in all cases where sulphur is present in the ore or substance to be analysed, if the nitric acid be employed, it must be very dilute, otherwise the sulphur will combine with its oxygen, forming sulphuric acid. In order to know when this takes place, the solution must be tested with nitrat of barytes. If, however, lead be present, it will combine with the sulphuric acid as it is formed, and fall to the bottom of the vessel.

*Reduction of the Ores, or smelting of Lead.*—Two processes are employed for the smelting of lead, the one by means of a blast furnace, called an ore-hearth, and the other by means of a reverberatory furnace. The latter is used throughout Derbyshire and North Wales, and is undoubtedly the best, where coal is not very scarce. In the former of these methods the ore and the fuel are mixed together, and exposed to the blast. The heat dissipates the sulphuret, the ore being the common sulphuret of lead or galena. A portion of the lead is oxydated, which facilitates the vitrification of the earthy parts of the ore, and of the fuel. These together constitute the slag or scoria. The metallic lead falls into the lower part of the hearth, and is defended from the oxygen of the blast by the scoria, which is fluid upon its surface. The liquid lead is let off from time to time, always retaining a portion for the scoria to float upon. When the whole of the lead is to be drawn off, the blast must be stopped, and some lime thrown upon the liquid scoria, which renders it concrete, while the lead, being still liquid, can be run off.

The reverberatory furnace employed for smelting lead is made on the same plan with those commonly used for puddling iron, differing in size, and a few other particulars. The fire is made at one end, and the flame plays over the hearth, entering an oblique chimney at the end, which terminates in a perpendicular one, of considerable height. The length of the hearth, from the place where the fire enters, to the chimney, is 11 feet; two feet of this length next the fire constitutes the throat of the furnace; the width of the same is four feet, and its depth about six inches; the

length of the fire-place is four feet, equal to the width of the throat; its width two feet, and depth three feet, from the grate up to the throat of the furnace. The rest of the hearth is a concave surface, nine feet long, four and a half feet wide at the throat of the furnace, seven feet four inches wide at the distance of two feet from the throat, seven feet two inches in the middle of the hearth, five feet eleven inches at two feet distance from the chimney, and two feet ten where the flame enters the chimney at two apertures, each ten inches square. These apertures terminate in the oblique part of the chimney, the section of which is 16 inches square, which communicates with the main chimney, the section of which is twenty inches square, supporting a straight horizontal line, drawn from the lower plane of the throat of the chimney to the opposite side of the furnace; the lowest part of the concave hearth, which is in the middle of this cavity, is nineteen inches below this line, the roof of the furnace being seventeen inches above the same line; the rest of the hearth is conformably concave.

On each side of the furnace are three openings, each about ten inches square, provided with iron doors, to be removed as occasion may require. They are arranged at equal distances from each other, between the commencement of the hollow hearth and the entrance into the chimney. The lower part of these apertures is on a level with the horizontal line above alluded to, being for the purpose of stirring and raking the ore, &c. Besides the larger openings there are two small apertures, one below the large middle opening, and nearly on a level with the bottom of the furnace; the other under that next to the chimney, at some distance above the first aperture. The first is a tap-hole for the lead, and the second for the scoria. The ore is introduced by a vessel in the shape of a hopper, placed in the roof of the furnace.

Previous to the ore being smelted, it requires to be separated as much as possible from the earthy matter in which it is imbedded. Although galena, which is the ore used for smelting, is most frequently accompanied by sulphat of barytes, fluats and carbonat of lime, it is found to exist in crystallized distinct masses, and can be separated from it by mechanical means to a tolerable extent. The whole of the ore, with the earthy matter, is pounded to a certain degree with hammers, and is chiefly performed by women. In some places, however, it is broken down by passing it through iron rollers pressed together by great weights. After the ore has been thus reduced, the earthy matter is separated by washing. The powder to be washed is introduced into a sieve or riddle, and placed in a large tub full of water. By a certain motion given to the riddle, the lighter or earthy parts are thrown over the edge of the same, while the galena, by its greater specific gravity, is retained. This process requires great dexterity, which can be acquired by experience only. There are, however, some impurities which cannot be separated by this mechanical process, and are generally smelted with the ore. These are *blind*, or *black-jack*, called by the smelter *muck ore*; pyrites, or sulphuret of iron, named *Brasil* by the workmen. When the ore abounds much with these substances, the process of smelting is more difficult, and requires an extra assistance of flux to reduce it.

In the state above described, the ore is introduced at the hopper in the middle of the roof of the furnace, and spread upon the concave hearth, to expose it as much to the flame as possible, in order to facilitate the escape of the sulphur. This should be performed by a long continued heat which is not violent, in order that the sulphuret itself may not be volatilized, an effect which, more or less, always takes place. The moment the sulphur has left the lead it begins

to combine with oxygen. The oxyd of lead, thus formed, combines with the earthy matter, which it renders so fusible as to become liquid upon the sulphur of the melted lead, and defends it from the future action of the oxygen. At this stage of the process the fire is raised to separate as quickly as possible the melted lead from the liquid scoria. The latter is now let off at the upper tap hole, leaving a small portion still upon the lead to preserve it from the air. The fire at this period is lowered, and a quantity of coal-flask thrown in upon the melted mass. This serves as well to facilitate the cooling, and to cause the reduction of some oxyd of lead, which also tends to stiffen the melted scoria. This last effect, however, is not produced sufficiently, till a quantity of powdered lime is thrown into the furnace. By this treatment the remaining scoria becomes concrete, and is then broken to pieces and pushed to the opposite side by means of a rake, and taken out of the furnace at the different openings on the same side. The liquid lead is now let out, at its proper aperture, into a large iron pan, or cistern, from whence it is laded into moulds to cast into pigs. The furnace is now ready to be charged again. When the ore abounds with much impurity, the oxyd of lead is not sufficient to give the proper degree of liquidity to the scoria. In this case a certain quantity of flux of lime is added, which has the property of forming a very fusible compound with sulphat of barytes, an ingredient very common in the ore.

This flux has been used from time immemorial for the same purpose, and has no doubt derived its name from its properties as a flux. See *Flux of LIME*.

The concrete scoria, which is taken out of the furnace, is found to contain some lead, independent of that in the state of oxyd, and chemically combined. This is generally lodged in the cavities of the spongy mass. These masses are taken to a kind of blast furnace, called a slag-hearth. By this second fusion of the scoria, the lead drops through the liquid mass into the lower part of the hearth, where it is not acted upon by the blast, and from thence is let off and cast into pigs. This lead is said to be of an inferior quality. Some ores of lead contain silver. The great affinity of lead for that metal is such, that the whole of it is found in the lead (see *SILVER*), from whence it is afterwards separated.

*Physical and chemical Properties of Lead.*—Lead is of a bluish-white colour, when made as bright as possible. This is best effected by scraping and burnishing. This polish it soon loses by exposure to air.

Its softness is such, that a cylinder of one inch in diameter and twelve inches long, may be easily bent by a person of ordinary strength; indeed, it is the most soft and flexible of the metals. Its specific gravity, according to Brisson, is 11.3523, and so far from being increased by the hammer, agreeably to that change in other metals by the same effect, Mufchenbroeck asserts that it is diminished. It may be here proper to observe, that those metals which are susceptible of the most perfect crystallization, will undergo the greatest condensation by the hammer, provided the metal be sufficiently malleable. Hence we find this property the most conspicuous in brass, and in blistered steel. See *METAL*.

Lead, in common with its softness, is the least elastic of the metals; so which also may be attributed its little tenacity. Its hardness is increased by hammering, and its tenacity in a proportionate degree.

Lead is exceedingly malleable, which connected with its excessive softness, admits of its being rolled into thin sheets with little power. Its tenacity, according to Dr. Thomson,

Thomson, is such, that a wire of  $\frac{1}{12.6}$  of an inch will support only 18.4 pounds. Lead fuses at about 600° of Fahrenheit, and if raised to a much higher temperature, will be found to diminish by evaporation. If lead be melted and poured into an iron mould, while the middle part will be liquid for a short time. If this liquid part be poured off, or let out at a plug-hole at the bottom, the interior surface of the solid part will exhibit a crystalline form. The crystals will be larger and more distinct as the cooling is slower.

Lead is much employed in the arts, particularly for buildings and cisterns. For the former of these purposes it has many advantages. It is easily worked into any shape on account of its great softness, and is sufficiently malleable to fold two edges over each other, so as make it watertight without soldering. This is a very great advantage, since, when the pieces are folded together, the expansion and contraction, by a change of temperature, soon breaks it to pieces.

Although it is at present in general use for water-cisterns, pumps, and pipes for conveying water, serious objections have been made to it by different philosophers, particularly Dr. Lambe, so far as regards its effects on the human economy.

A very ingenious paper was some time ago published by Morveau, in which he shews that the water exposed to the leaden vessels would frequently be pernicious, if some sulphuric acid were not present, which never fails to precipitate lead from any of its solutions. Thus we see that lead is the least objectionable for mineral waters containing the sulphuric acid, which is very general in almost all springs.

Great mischief has been produced by the use of lead in dairies; although we lament to say that this practice is still followed up to a certain extent. If the milk runs into the slightest acidity, we must expect some lead to be dissolved, and its probable consequences if taken into the stomach.

The disease called the Devonshire colic, was proved by sir George Baker, in several excellent papers written by him, and published in the Philosophical Transactions of that time, to be occasioned by lead dissolved in the cyder, and which had been furnished from the cyder presses, which were lined with that metal; but was in consequence of this valuable discovery laid aside.

We have heard of a similar disease in the West Indies, acquired by drinking new rum. The rum was found to contain lead, which had been taken from the leaden worm used for the condensation of the spirituous vapour. What, however, is very singular, the rum lost its deleterious property by keeping about twelve months. This fact was not explained at the time, but it has lately been cleared up by a series of experiments made by the writer of this article. The new rum is generally put into oak casks, from whence the liquor extracts a quantity of tan and gallic acid. These substances combine with the lead in solution, forming a perfectly insoluble substance, which falls to the bottom of the cask. These facts shew that lead should not be used in any situation where fermented liquors are present, since in every stage of their existence, they contain more or less acetic acid. And it must not be forgotten, that all distilled spirits will contain the same acid, from the circumstance of its being volatile and coming over with the spirit.

We have, however, abundant satisfaction in knowing that the existence of lead and gallic acid in spirits, wine, or

other fermented liquors, are incompatible: and that all liquors which have been kept in oak casks for a certain time must be freed from lead. If we find the presence of gallic acid by a solution of iron, we may pronounce such liquid free from lead.

These observations, which may appear out of place, are given with a view to guide those who may be making or using vessels of lead, which, under some circumstances, are attended with deplorable consequences.

*Alloys of Lead formed with other Metals.*—One part of tin and two of lead form an alloy, fusible at about 350 of Fahrenheit, and used by tinmen and others under the name of soft folder. See **SOLDER**.

Lead forms an imperfect alloy with copper. The metal used for common brass-cocks is an alloy of these two metals. The lead is so imperfectly combined with the copper, that when a piece of the metal is exposed to a certain heat, the lead separates from the copper in bright globules of the former.

The alloy of antimony with lead is not uncommon. Sixteen of lead and one of antimony form the printers' type metal.

Lead easily combines with mercury, forming an amalgam. This is effected either by putting mercury into melted lead, or by putting lead, in small particles, to the mercury. See **AMALGAM**.

An alloy of silver and lead is easily formed. Indeed lead is frequently used to take silver from plated iron, which is afterwards got from the lead by cupellation.

We are indebted to Mr. Hatchett for some valuable facts relative to the alloys of lead and gold. One part of lead to eleven of gold forms a very brittle alloy, having a fracture of a pale brown colour, destitute of metallic lustre.

The alloys in any proportion have the singular property of being of less specific gravity than the mean, the very contrary of which is observed in most other compounds of metals. The following is a table given by Mr. Hatchett exhibiting these facts.

Metals.	Grains.	Specific Gravity of Alloy.	Bulk before Union.	Bulk after Union.	Expansion.
Gold Lead	442 38	18.08	1000	1005	5
Gold Copper Lead	442 19 19	17.765	1000	1006	6
Gold Copper Lead	442 30 8	17.312	1000	1022	22
Gold Copper Lead	442 34 4	17.032	1000	1035	35
Gold Copper Lead	442 37.5 .5	16.627	1000	1057	57
Gold Copper Lead	442 37.75 .25	17.039	1000	1031	31

When lead is exposed to the air for a little time, it soon appears of different colours, not unlike the prismatic colours. By a longer exposure, assited with moisture, it becomes covered with a white powder. This is the oxyd of lead combined with carbonic acid. This change is facilitated by heat, and fill more by the fumes of acetic acid or vinegar. It is by this means that the white lead of commerce is made, of which we shall treat hereafter.

If melted lead be exposed to the oxygen of the atmosphere, a greyish-yellow powder begins to form upon the surface. By keeping it exposed for some time, the powder becomes more yellow. In this state it is called *massicot*, or yellow oxyd of lead. It contains about 6.88 of oxygen.

This oxyd is made, in the large way, in a furnace not unlike a baker's oven. The middle of the hearth contains a recess for exposing the melted lead. On each side, and a little below the level of the hearth, is a fire, the flame of which passes slowly over the hearth, giving sufficient heat to keep the lead melted, and passes up a chimney near the mouth of the furnace. As soon as the lead is melted, a person is constantly employed to agitate it, in order to expose greater surface to the air. This manual operation is performed by a rake suspended from a chain, so that the perpendicular part of the rake dashes through a portion of the melted lead, by merely moving it backwards and forwards. By the same motion, the oxyd which is formed is pushed away from the surface of the lead, leaving it free to the action of fresh oxygen. This process being kept up, the lead is at length converted into a greenish-yellow powder, mixed with lumps of metallic lead. This powder is ground in a mill and then washed, by which means the metallic lead is separated, and the powder becomes of a more bright yellow. The green colour was therefore owing to a mixture of the blue particles of lead, mixed with the yellow oxyd. The yellow oxyd here produced is called *massicot*; which see.

This oxyd appears capable of combining with more oxygen by a second exposure. For this purpose the yellow powder, after being washed and dried, is returned into the furnace above-mentioned, or one of similar construction, kept for this second process only. The heat is kept uniform but not great, and the oxyd raked about to expose as much surface as possible. It gradually changes colour, and ultimately assumes a splendid red. In this state it is called *minium*; which see. Although during this process the oxyd appears gradually to pass through all the shades of orange colour from yellow to red, the two latter can only be considered as distinct oxyds, the intermediate tints being mixtures of the two.

If we consider the yellow as the first or protoxyd, the red will be the second, and the brown, yet to be treated of, the third and the peroxyd. Proust, however, has given some reason to believe that the yellow is not the first. The oxyd which is precipitated from the nitric acid when heated to redness, to drive off the water and carbonic acid, is found to be the yellow oxyd in a very perfect state. The author above-mentioned informs us, that if crystals of the common nitrat of lead be boiled with some pieces of metallic lead, scaly yellow crystals are formed. This salt, decomposed by potash, affords an oxyd which Proust supposes to contain less oxygen than the yellow. Dr. Thomson repeated his experiment; he found the oxyd not to differ in appearance from the yellow, and makes it to consist of lead, 91.5, lead, and 8.5 oxygen. This appears to be rather less oxygen than, according to his own analysis, is contained in the yellow. But there is reason to believe, that in Dr. Thomson's analyses of the yellow oxyd, the oxygen is rated too high. The

fame oxyd, according to Bucholz, is composed of 100 lead and eight of oxygen, equal to 7.4 per cent. This analysis appears to have been made under such circumstances as to entitle it to much credit. From the average of three analyses of the yellow oxyd, obtained from acetat of lead, the writer of this article made the oxygen 7.4 per cent. Hence we have abundant reason to doubt the existence of an oxyd below the yellow oxyd, since it appears, from Dr. Thomson's own account, that the oxyd, said to consist of less oxygen than the yellow, contains 8.5 per cent., being 1.1 more than Bucholz makes the yellow oxyd.

If nitric acid in sufficient quantity be added to the red oxyd of lead, nearly the whole will be dissolved;  $\frac{1}{3}$ th of the oxyd will remain at the bottom of the vessel, which, when collected and dried, is of a dark brown colour, and is called the brown oxyd of lead. The following process is given by Vauquelin: Mix a quantity of the red oxyd of lead with water in a Woulff's apparatus, and let the oxymuriatic acid gas pass through the mixture. The oxyd gradually becomes of a deeper colour, and is at last dissolved. From this solution the brown oxyd is precipitated by potash. From every 100 parts of the red oxyd 68 of the brown may be obtained.

This oxyd is of a flea-brown colour, having no smell or taste. It is insoluble in any of the acids. It converts the muriatic into oxymuriatic acid, by giving up a portion of its oxygen. When rubbed briskly in a mortar with powdered sulphur, the sulphur inflames, producing a strong smell of sulphurous acid. According to the analysis of Proust, this oxyd is composed of 79 lead and 21 oxygen. Dr. Thomson makes it 81.6 lead and 18.4 oxygen.

It appears highly probable that we have only three oxyds of lead, namely, the yellow, the red, and the brown. The first, according to Proust, contains 9 per cent.; Thomson, 10.3; Bucholz, 7.4; the writer of this article, 7.4: the average of all these being 8.5. The red oxyd, by Dr. Thomson's analysis, contains 12 per cent.: the brown, according to Proust, contains in the 100, 21 oxygen; Dr. Thomson makes 18.4: the mean of these is 19.7.

Agreeable to the average results of these different analyses, we cannot help being forcibly struck with the beauty of Mr. Dalton's hypothesis relative to the limited proportions with which bodies combine. He makes the atom of lead to weigh 95, or to be 95 times heavier than an atom of hydrogen; the atom of oxygen being 7 times heavier. In referring to the doctrine advanced by this ingenious chemist, it will be seen that he holds the necessity of bodies combining atom to atom, or in some multiple of the same; as, 2 to 1, 3 to 1, &c. The first oxyd of lead, agreeably to the above data, must be 1 to 1, or 95 to 7; the second oxyd, 95 to 14; and the third, 95 to 21. Hence these

proportions reduced to 100, will stand as follows:  $\frac{95 + 7}{7}$

$= \frac{100}{6.86}$ , or 6.86 in the 100, for the first oxyd. Then,

for the second,  $\frac{95 + 14}{14} = \frac{100}{12.84}$ , or 12.84 in the 100.

Lastly, for the third or peroxyd,  $\frac{95 + 21}{21} = \frac{100}{18.1}$ , or

18.1 in the 100. The proportions by analysis give, for the first, 8.5; second, 12; and the third, 19.7: by theory, 6.86, 12.84, and 18.1.

The second and third oxyds of lead give out oxygen, by exposure to heat in a crucible, and are reduced to the state of the first oxyd. If the heat be raised a little above redness,

ness, the yellow oxyd fuses into a glass, in which state it is called the vitreous oxyd of lead. It becomes so exceedingly fluid, as to run through the common crucibles. In this state it has the power of oxydating, and combining with the oxyds of all the metals which are oxydatic, by exposure to air with heat: and hence is employed to great advantage in the cupellation of the nobler metals. See SILVER.

When lead is oxydated at a high temperature, such as that employed in the separation of silver from lead, the yellow oxyd fuses as it is formed, and is blown from the surface of the lead by bellows. In this state it is called *libarge*; which see. It consists of the yellow oxyd, united to a portion of carbonic acid. For this part we are indebted to Dr. Thomson.

Lead combines with sulphur and phosphorus.

*Sulphur of lead* may be formed by projecting sulphur into melted lead, or by stratifying thin plates of the metal with the sulphur. The compound is very brittle, of a dark grey colour. It may be crystallized by slow cooling; under which form it exhibits a brilliant fracture, resembling the native sulphuret, or *galena*. This sulphuret, according to Dr. Thomson, consists of 86 lead and 14 sulphur. According to Dalton's hypothesis, it consists of one atom of lead to one of sulphur: the former atom being 95, and the

latter 13, will give  $\frac{95 + 13}{13} = \frac{100}{12}$ , or 12 to 100; which agrees with several other analyses very nearly.

Lead appears capable of combining with a second dose of sulphur, constituting a compound, which is more brilliant, and of a lighter colour. It may be easily distinguished from the common kind, by its burning in the flame of a candle.

It is called the *super-sulphuret of lead*, and, according to Dalton's hypothesis, must consist of one atom of lead and

two atoms of sulphur, which would give  $\frac{95 + 2 \times 13}{26} =$

$\frac{100}{21.5}$ , or 21.5 per cent. Dr. Thomson makes it 25 per cent.

It is to this chemist we are indebted for our knowledge of this substance.

*Phosphuret of lead* may be formed by mixing together equal parts of filings of lead and phosphoric glass; the mixture being fused in a crucible. It is of a silvery blueish-white colour. It possesses slight malleability, and may be cut with a knife. It is composed of 88 lead and 12 of phosphorus. Dalton makes the atom of phosphorus to weigh 9;

hence this compound of 1 to 1 will give  $\frac{95 + 9}{9} = \frac{100}{8.6}$ .

*Salts of Lead.*—Most of the acids combine with the yellow oxyd of lead, forming peculiar compounds. By far the greatest proportion of these compounds is insoluble in water. All those which are soluble have a sweetish taste, attended with a roughness which it leaves on the tongue, similar to that of red port, and some other wines. This property has caused it to be used for the villainous purpose of mixing with four wine, which does not only take up the acid, but adds a roughness and sweet vinous flavour, exceeding imping upon the palate. Some have suspended bags of it in the casks of wine; others have added common white lead.

Mankind are now so well acquainted with the different tests for lead, that it is very seldom found in those liquors. Water impregnated with sulphuretted hydrogen gas will

instantly turn wine muddy and black, which contains lead. A solution of iron be dropped into wine, and it turns black, the presence of gallic is indicated: and from what we before observed, the existence of lead and that acid are incompatible in the same liquid.

*Sulphat of Lead.*—Lead is scarcely acted upon by the fulphuric acid, in the cold. If the acid be boiled with the lead, fumes of fulphurous acid will be given out, and a portion of the lead oxydated, which combines with the acid, forming a whitish patty compound. If the acid be in excess, and the mass washed in water, the substance becomes divided into two portions, namely, the sulphat of lead, which is insoluble, and the super-sulphat, which is slightly soluble, and will be deposited in crystals.

It is from the circumstance of the infolubility of the sulphat of lead, that the metal can be used with such advantage for the lead-houses, used in making sulphuric acid, and for making vessels which have to hold this acid. The sulphat which first forms upon the surface defends the lead not only from the action of this acid, but from any other solvent of this pernicious metal. Sulphat of lead may be best formed by adding sulphat of soda to the acetat of nitrat of lead. A dense white precipitate is formed, which is sulphat of lead. This salt is produced in great abundance by the calcio-printers, in making acetat alumine, with alum and acetat of lead. It forms an excellent paint with oil, for standing the action of acids.

Kirwan gives the proportion of this salt at 23.37 acid, 75 acid yellow oxyd, 1.63 water in the 100; Bucholz, 24.72 acid, 75.28 oxyd; and Klaproth, 26.5 acid, and 73.5 oxyd: the mean of these is 24.86 acid, and 75.14 base. Calculated by Dalton's theory, the atom of ful-

phuric acid weighs 34: therefore,  $\frac{95 + 7 + 34}{34} = \frac{100}{25}$ ;

or, the acid is 25 in the 100: then,  $100 - 25 = 75$  the base.

*Sulphite of Lead.*—The sulphurous acid has no action upon lead: but it combines with the yellow oxyd, forming an insoluble compound, having no remarkable properties. When exposed to a red heat, the acid is disengaged, in the form of gas.

When the sulphurous acid is added to the red oxyd of lead, the acid takes oxygen from the oxyd, reducing it to the state of yellow oxyd. The acid is converted into the sulphuric, and combines with the oxyd, forming the sulphat of lead.

Dr. Thomson gives the proportions at

74.5 oxyd,  
25.5 acid.

100

*Nitrat of Lead.*—When the nitric acid is a little diluted, it acts with considerable rapidity upon lead. If it be a little assisted by heat, the whole will become speedily dissolved, forming nitrat of lead: This consists of the yellow oxyd of the metal united to a portion of the acid. If the solution be evaporated, it affords crystals of tin, in six-sided pyramids of a silvery white colour. This salt dissolves in  $\frac{7}{5}$  of boiling water. When the crystals are heated, they undergo a slight detonation: the same takes place when they are rubbed with sulphur in a hot mortar.

According

According to experiments of Dr. Thomson, this salt consists of,

66 oxyd,
34 acid.
—
100

When the crystals of the last salt are boiled with metallic lead, yellow fealy crystals are formed, constituting, according to Dr. Thomson, a subnitrat, consisting of

81.5 oxyd,
18.5 acid,
—
100

By Dalton's theory the weight of an atom of nitric acid is 19: in most of the nitrats he supposes one atom of the base to unite with two atoms of acid. The nitrat of lead, already described, should, according to the above analysis, consist of at least two atoms of acid to one of base, for  $\frac{102 + 2 \times 19}{38} = \frac{100}{27.14} = 27.14$  of acid, and 72.86 of base.

The acid here falls considerably short of that in the analysis of Dr. Thomson. The latter salt, which we have called the subnitrat, should have one atom less of acid.

Hence  $\frac{95 + 7 + 19}{19} = \frac{100}{15.7}$ , which gives 15.7 acid, and 84.3 of oxyd = 100.

*Muriat of Lead.*—Muriatic acid has a very feeble action on lead, but it readily dissolves the yellow oxyd, forming the muriat of lead. This salt may be also formed by adding muriat of soda to nitrat of lead. The precipitate which is formed is the salt in question. It dissolves in 22 parts of cold water. This is the fact only when no excess of this acid, or when no other acid is present; since the salt is soluble in most acids to a greater extent than in water. When this salt is mixed with the sulphat of lead, it may be separated from it by its solubility in the acetic acid. Muriat of lead is much more soluble in hot than in cold water. Hence, when a saturated hot solution is suffered to cool, the salt is deposited in crystals of a silvery-white colour. When heated they readily melt, and on cooling assume a slight transparency, from which it has been called *Plumbum cerneum*.

On the application of greater heat some of the salt evaporates in a white smoke, leaving behind a substance, which is said to be a submuriat of lead.

The composition of muriat of lead is, according to Klaproth,

Acid 13.5
Oxyd 86.5
—
100

By Kirwan's account,

Acid 17
Oxyd 83
—
100

The weight of the atom of muriatic acid being 22, we shall have by Dalton's theory  $\frac{95 + 7 + 22}{22} = \frac{100}{17.74}$ , by

which we have 17.74 acid, and 82.26 of oxyd, which comes very near to Kirwan. When the muriatic acid is poured on the red oxyd of lead, the lead gives up a part of its oxygen to the muriatic acid, constituting the oxymuriatic acid. The muriatic acid then unites with the yellow oxyd thus formed, while the oxygen is returned to the remaining red oxyd, forming the brown oxyd.

The substance above-mentioned, said to be a submuriat, appears rather ambiguous, and may, perhaps, be a mere mixture of the common muriat with the yellow oxyd of lead. There is, however, one argument in favour of its being a proper compound. It is said not to be soluble in water, or that the excess of oxyd is attached to the muriat, so as to prevent its being separated by the affinity of the water for the salt.

The common way of forming this substance is by adding to the muriat of soda a much larger quantity of litharge than would be necessary to saturate the acid of the salt. We are indebted to Vauquelin for the best account of the nature of this anomalous decomposition. At the same time the muriat of lead is decomposed by soda. We have the fact before our eyes, that an oxyd of lead will completely decompose the muriat of soda. If we state the experiment of Vauquelin we shall be better able to give an opinion. To one part of muriat of soda he added seven of litharge in fine powder, with as much water as made the mixture of the consistency of thin soup. This was frequently stirred for several hours. The litharge gradually lost its colour, and ultimately became white. It increased in bulk, and so much water was absorbed as to make it necessary to add more. At the end of four days the chemical action had entirely subsided, when the result was examined. The liquid part, when separated by the filtre, had a strong taste of soda, with a taste of muriat of lead, but no muriat of soda was present. The liquid afforded crystals of carbonat of soda by evaporation. The substance from which the liquor had been separated, when washed and dried, was of a dirty white colour, and was found to have increased in weight  $\frac{1}{4}$ th of the whole oxyd employed. When this substance was heated to a certain degree it assumed a fine yellow colour, by which it lost  $\frac{1}{27}$ th of its weight. This was, perhaps, carbonic acid and water.

Some caustic soda was added to a part of this substance, which changed its colour to that of a dirty yellow, and the residuum was found to be a mass of crystals of muriat of lead. By the test of an alkaline hydro-sulphuret, the soda appeared to hold a great quantity of the oxyd of lead in solution.

The one part of muriat of soda, used in this experiment, consisted of .44 of acid, and .56 of soda. The .44 acid would combine with 2.4 of the yellow oxyd to form 3.84 of muriat of lead, leaving  $7 - 2.4 = 4.6$  of oxyd of lead. This is supposing the true muriat to be formed; but if a submuriat were formed, it must consist of more than one atom of lead united to one of acid. Suppose it one of acid to two of oxyd, then  $.44 + 2 \times 2.4 = .44 + 4.8 = 5.2$  of submuriat, still there would be free oxyd left. But the author tells us that the yellow substance was insoluble in water, or that the water would not take the muriat from the excess of oxyd, although the nitric acid, as well as the soda, was capable of that effect. If there were no free oxyd when two atoms of lead were to one of acid, let us suppose them three to one, we shall then have  $.44 + 3 \times 2.4 = .44 + 7.2 = 7.64$  of a second submuriat. If, therefore, we are to rely upon the fact, that the muriat of lead could not be dissolved, leaving the excess of oxyd, we must regard this

this yellow substance as a legitimate compound. If the contrary be the case, we must regard it as a mixture of the true muriat mixed with the yellow oxyd of lead. This substance has been manufactured under a patent by Mr. Turner, of Newcastle-upon-Tyne, and is deemed a valuable pigment for painting.

*Phosphat of Lead.*—The phosphoric acid does not act upon lead in the cold, and but very feebly by heat. The result of this action is the formation of an insoluble compound, which is the phosphat of lead.

This salt may be more easily formed by adding together the solutions of phosphat of soda and the nitrat, or acetat of lead. A dense white powder subsides, which is the salt in question. This salt is insoluble in water, but it dissolves readily in nitric, and also, when assisted by heat, in the muriatic acid. On the latter solution cooling, crystals of muriat of lead are deposited; a proof that a partial decomposition takes place. It is also decomposed by the sulphuric acid, by the assistance of heat.

When this salt is heated it melts, and on cooling assumes a crystalline appearance.

It is from this salt that phosphorus is generally obtained; for when it is exposed to a great heat, in an earthen retort, with charcoal, both the lead and the phosphorus lose their oxygen, the latter being distilled over.

Mr. Dalton makes the atom of phosphoric acid to weigh 23, then  $\frac{95 + 7 + 23}{23} = \frac{100}{18.4}$ ; so that this salt, from these data, consists of 18.4 of acid, and 88.6 of oxyd, which is very near the proportions of the native salt.

*Carbonat of Lead.*—Carbonic acid does not act upon lead; but it combines with the yellow oxyd of lead, forming an insoluble white powder, which is manufactured under the name of *white lead*.

This salt may be formed by adding a carbonat of potash to the acetat or nitrat of lead. The precipitate, being washed and dried, is snowy-white powder, appearing to the eye well calculated to make a much finer white paint than that made in the common way. Although the carbonat formed by precipitation is, no doubt, chemically the same with the manufactured, their difference, in point of density, is very remarkable. The proportions of the constituents of this salt are, according to Bergman, 16 acid, 84 oxyd; to Chenevix, 15 acid, 85 oxyd; Proust, 16.15 acid, 83.85 oxyd; and Klaproth, 16.33 acid, 83.67 oxyd in the 100.

The manufacture of white lead has been known long before any idea was entertained of its composition, or the theory of the process; and it is rather singular that no more improvement has been made in the common process, which has long appeared to chemists as clumsy and uneconomical.

The process consists in exposing thin sheets of lead to the fumes of vinegar at a certain temperature. The lead is cast into sheets about two feet long, five or six inches broad, and about  $\frac{1}{4}$ th of an inch thick. These are coiled up, rather spirally, into a cylindrical shape, about five or six inches diameter. The vinegar is placed in the bottom of earthen pots, which are different in size at different manufactures; some holding three pints and others five or six. There is a ledge round the pot, in the inside, about an inch deep, for the purpose of supporting the cylindrical coil of lead, which stands upon it like a chimney. The pots thus fitted, with the lead and vinegar, are arranged in rows, upon a stratum of horse-litter, or, what is now used as being cheaper, the refuse bark of tanners. The ends of all the

cylinders of lead are covered with a plate of the same metal, to confine the whole as much as possible to the action of the vapour. The pots thus placed are covered over with litter or bark, and a new stratum of pots arranged in a similar way over them. Several tons of lead are sometimes exposed in this manner at one time. The heat arising from the fermentation of the vegetable or animal matter keeps up a certain temperature, by which the vinegar is slowly evaporated. The vapour oxydates the lead, and the oxyd combines with carbonic acid. This latter substance was formerly thought to be furnished by the fermenting substance in which the pots were imbedded: it is now, however, known, that the vinegar is decomposed, and furnishes the carbonic acid. White-lead works are at present carried on, both on the continent and in this country, in which the heat is furnished by artificial means only; and of course the carbonic acid can come from no other source than that of the vinegar.

After the lead has been exposed to the vapour of the vinegar for about six weeks or two months, the pots are withdrawn, and the coils of lead are found corroded to a considerable thickness. The white carbonat thus formed is very brittle and very hard. The sheets are now passed through rollers for the purpose of breaking the white lead from the uncorroded metallic lead. The powder is now taken to a pair of stones, and ground in a manner similar to corn. After this it is levigated to get it of the greatest possible fineness, and it is then gradually dried in stoves for the purpose.

Density and whiteness are the most valuable properties of white lead. These properties do not depend upon the proportions of its elements, but upon the mechanical treatment. The density in all probability will be greater, as it has been longer forming, by the action of the vinegar being slower. Some of the pieces of white lead, as they are separated from the sheet, are much harder than others, even in the same bed. This hardness and density are sometimes so great as to render the pieces sonorous. In this state it is the most valuable. Hence the whitest and densest pieces are selected for making the beautiful substance called *flake white*.

The value of white lead is easily ascertained by the painters, from the quantity of oil required to give it proper consistency. The greater the proportion of lead to the oil, the greater is said to be the body of the paint, and the greater will be its whiteness. The carbonat of lead made by precipitation, when in a dry state, is much whiter than the best white lead, made in the common way. If, however, equal weights of the two be mixed with oil to make them fit for painting, the precipitated specimen will be found to take a much greater quantity of oil than the other, and its whiteness much diminished. The common white lead will have lost so little of its whiteness, that the contrast will be very strikingly in favour of the latter. This fact is exceedingly apparent, on mixing together transparent media of different densities. The whiteness of snow depends upon the mixture of small particles of ice with air; for when the same are mixed with water, the whiteness disappears. All colourless transparent bodies become white on being reduced to powder. This is observed in powdered glass and in salts which lose their water of crystallization. Whiteness may therefore be said to arise from a confused refraction of light, rather than from reflection. See LIGHT.

*Fluat of Lead.*—Fluoric acid does not oxydate lead; but it is capable of combining with the yellow oxyd, forming this salt, which is an insoluble compound. It may be formed.

## L E A D.

formed better by adding the fluat of ammonia to nitrat or acetat of lead, the fluat of lead falling down in a flate of powder.

*Borat of Lead.*—Boracic acid does not act upon lead. This falt, however, may be formed by adding a solution of borat of soda to nitrat of lead. The borat of lead will be precipitated in the form of an infoluble white powder. This falt, from a vitreous flate which the acid is capable of afuming, melts into a colourless glafs before the blowpipe.

*Acetat of Lead.*—Acetic acid has little or no action upon lead when the metal is immerfed in it; but the fumes of the acid in contact with air is capable of oxydating lead, as we have shewn in the manufacture of white lead. The oxyd thus formed is easily taken up by the acetic acid, forming a foluble compound of a sweetish and atringent taste. If the solution be evaporated, an excefs of the acid being present, the falt is obtained in needle-formed crytals, and of the lultre of fatin. It diffoves in about four times its weight of water at 60°. It is fingular that this falt is decomposed by the carbonic acid. It is from this circumstance that we always find it decomposed, in some degree, by difolving it in water, which generally contains more or lefs of that substance. This falt is used in medicine, uncrystallized, under the name of *Goulard's extrañt*.

The acetat of lead is an article of extensive manufacture in England, France, and Holland.

Common diftilled vinegar is first saturated with the yellow oxyd of lead, which is sometimes from the carbonat or white lead, and frequently from litharge: the latter, however, is the cheapest process. The solution should have a little excefs of acid, else it does not form the real falt. By slow evaporation this solution crytallizes, in which flate it is used in abundance in the arts, particularly by the calico printers, for the purpose of getting the acetat of alumine, by double decomposition with alum.

The analysis of this falt, according to Dr. Thomson, is

26	Acid
58	Yellow oxyd
16	Water
<hr/>	
100	

From the combinations of the acetic acid, the earths, and alkalies, it appears that the weight of its atom is about 36.

We have hence  $\frac{102 + 36}{36} = \frac{100}{26}$ , which gives 26 of acid and 74 of yellow oxyd = 100.

*Subacetat of Lead.*—When the last falt is boiled for some time with the yellow oxyd of lead, a peculiar falt is formed, confisting of two atoms of oxyd, and one of acid. It is lefs foluble in water than the acetat. It was first noticed by Thenard, to whom we are indebted for the following analysis:

17	Acid
78	Oxyd
4	Water.

If it consists of two atoms of base to one of acid, its analysis, according to the data in the acetat, will be  $\frac{2 \times 102 + 36}{36}$

=  $\frac{100}{15}$ , which gives 15 acid, and 85 oxyd = 100.

*Oxalat of Lead.*—This falt is formed by difolving the oxyd of lead in oxalic acid. In all probability there are two falts of this species. That given by Dr. Thomson is formed

with the second oxyd, and an excefs of acid, and is the superacetat. According to Bergman's analysis it contains

41.2	Acid
58.8	Red oxyd
<hr/>	
100	

The weight of the atom of oxalic acid appears to be 39, and an atom of the oxyd in this falt 95 lead + 14 oxygen = 109, therefore supposing it the super falt  $\frac{95 + 14 + 39 \times 2}{39 \times 2}$

=  $\frac{100}{41.7}$ , which gives 41.7 acid, and 58.3 red oxyd = 100.

The proper oxalat of lead may, no doubt, be formed by an alkaline oxalat being added to the nitrat of lead, the falt being precipitated in a flate of infoluble powder. From the above data it ought to consist of 27.7 and 72.3 yellow oxyd.

*Tartrat of Lead.*—The tartaric acid does not act upon lead; but this falt may be formed by adding an alkaline tartrat to the acetat, or nitrat of lead. The tartrat of lead falls down in the form of white powder. Dr. Thomson gives the analysis of this falt at 37.44 acid, and 62.56 yellow oxyd.

*Cürat of Lead.*—This is an infoluble compound, formed by adding an alkaline citrat to a foluble falt of lead.

*Malat of Lead.*—Malic acid has no action on lead; but the acid combines with the oxyd, forming a compound infoluble in water, but foluble in acetic acid. Cyder, which contains an abundance of malic acid, would never contain lead, but from the presence of acetic acid. If acetat of lead be dropped into cyder, a copious precipitate falls down, but if free acetic acid be added, the precipitate is difsolved.

*Arseniat of Lead.*—The arsenic acid is capable of oxydating lead, and then combines with its oxyd, forming arseniat of lead, which is completely an infoluble compound. It may also be formed by adding the arseniat of potash to a foluble falt of lead. From the analysis of Chenevix it consists of 33 acid, 63 yellow oxyd, and 4 of water. According to Thenard, it is composed of 35.7 acid, and 64.3 of oxyd. See the native arseniat of lead under the mineralogical part of this article.

*Molybdat of Lead.*—The artificial falt of this species has been little examined. See the native falt.

*Chromat of Lead.*—This falt may be formed by adding an alkaline chromat to a foluble falt of lead. The falt is precipitated in the form of powder of a reddish-yellow colour. It is foluble in potash and soda, from which it may be precipitated without changing its properties. It is foluble in nitric acid, but it is decomposed by the muriatic and fulphuric acids. See native falt.

The other species of the falts of lead are not of importance.

The alkalies and some of the earths difsolve the oxyd of lead.

Potash and soda, when pure, difsolve the greatest proportion. By exposure to the air, however, the carbonic acid of the atmosphere combines with the oxyd of lead, as well as the potash. The lead is precipitated in a flate of carbonat.

These alkaline solutions of lead have the property of staining hair, wool, and horn. The tint commences with a light fawn colour, and ultimately becomes of a deep and beautiful reddish-brown. These colours are not permanent, being quickly faded by exposure to the light and the air.

Lime

Lime water, and probably solutions of barytes and strontian, dissolve the oxyd of lead, but in smaller quantity. A liquid formed by boiling lime and litharge in water, has also the property of staining wool, but the colour is somewhat different to that given by the alkaline solution. The brown colour has less of the red and more of the yellow tint. A composition of common pearl-ash, red lead, and quick-lime, is used to give horn the appearance of tortoise shell. In effect, this composition is a solution of the oxyd of lead in potash.

Lead, as we have already seen in the preceding part of this article, is much used in building, particularly for covering gutters, pipes, and in glass windows. For which uses, it is either cast into sheets in a mould, or milled; which last, some have pretended, is the least serviceable, not only on account of its thinness, but also because it is so exceedingly stretched in milling, and rendered so porous and spongy, that when it comes to lie in the hot sun, it is apt to shrink and crack, and consequently will not keep out the water. Others have preferred the milled lead, or flatted metal, to the cast, because it is more equal, smooth, and solid.

The lead used by glaziers is first cast into slender rods, twelve or fourteen inches long, called *canes*; and these, being afterwards drawn through their vice, come to have a groove on either side for the panes of glass; and this they call *turned lead*.

The method of paling or foldering lead for fitting on of inbossed figures, &c. is by placing the part whereon the figure is to be paled horizontal, and strewing on it some pulverized resin; under this they place a chafing-dish of coals till such time as the resin becomes reddish, and rises in pimples; they apply the figure, and rub some soft folder into the jointing; when this is done, the figure will be paled on, and as firm as if it had been cast on.

Lead is much used in varnishes and painting with oil, both as a colour and as a dryer. It is also used in the preparations of enamels and of porcelain as a flux, and makes the basis of the glazing of almost all pottery wares; and by means of lead the most perfect metals are refined and assayed.

**LEAD, in Medicine.** This metal is celebrated by some chemical writers for its great medical virtues; but after all it seems to be a metal which ought to be given internally with the greatest caution, and to be rather calculated for outward application. Its ore is so poisonous, that the steam arising from the furnaces where it is worked, infects the grass of all the neighbouring places, and kills the animals which feed on it. The poisonous quality of this ore is such, that the people who live in the countries where it is dug, and near the places where it is washed, can keep neither dog nor cat, nor any kind of fowl, but all die in a short time, and it has been known that a little house, in which lead ore had been kept for some time, though afterwards made very clean, and bedded with fern, infected calves which were put into it, so that all died in a very short time; and it is a too melancholy observation, that children often die strangely and suddenly about these places. *Philosophical Collections*, N<sup>o</sup> 2. p. 6.

Its best preparation is *saccharum saturni*, or the super-acetate of lead; which, though capable of doing great good in hæmorrhages, and some other cases, is apt, however, to bring on colics of so violent a kind, that the remedy often proves worse than the disease.

The internal use of lead is dangerous, on account of the colics and palsies that are occasioned by it. Culinary vessels, lined with a mixture of tin and lead, which is the usual

method, are apt to communicate to acid foods pernicious qualities, and require to be used with great precaution. The same thing has been also said of liquors kept in glazed ware, and of cyder made in vessels, where lead is used, and of wines adulterated with litharge, &c. See the article **LEAD**, *supra*, and **COLICA Pietsanum**.

M. Navier has lately discovered that the liver of sulphur, and particularly liver of sulphur of Mars, is an excellent antidote against the poison of lead; and he advises patients labouring under its pernicious effects to drink largely of acidulated liquors, to make afterwards the liver of sulphur the principal part of the cure, and to finish the cure with gentle purgatives.

The Dutch have been charged with correcting the more offensive expressed oils, as that of rape seed, so as to substitute them for oil olive or oil of almonds, by impregnating them with lead: in order to detect this abuse, mix a little of the suspected oil with a solution of orpiment made in lime-water: on shaking them together, and suffering them to rest, the oil, if it has any saturnine taint, will appear of an orange-red colour: if pure, of a pale yellowish. The lead is discovered in wines by the same sulphurous solution, which changes the colour of wines impregnated with this metal to a brownish red or a blackish hue. However, the various preparations of lead are applied externally with safety and great benefit, on account of its sedative, drying, and repellent qualities. The vinegar and sugar of lead, and all the ointments and plasters which contain ceruss, minium, or litharge, eminently possess these qualities. See the following articles and references.

For the laws relating to lead, and the stealing of it, see 27 Ed. III. stat. 2. c. 1. 3. 15. 38 Edw. III. stat. 1. c. 6. 4 Geo. II. c. 32. 29 Geo. II. c. 30. See **LARCENY**.

**LEAD, Black.** See **PLUMBAGO**.

Black lead in fine powder may be readily mixed with melted sulphur, and though the compound remains fluid enough to be poured into moulds, it looks nearly like the coarser sorts of black lead itself. This was probably the method by which prince Rupert is said to have made black lead run like a metal in a mould, so as to serve for black lead again. *Birch's Hist. Royal Soc.* vol. iii.

The German black-lead pencils, and those which are hawked about among us, are prepared in this manner: their melting or softening, when held in a candle, or applied to a red-hot iron, and yielding a blueish flame, with a strong smell like that of brimstone, discovers their composition. Pencils of this kind are hard and brittle, and cut or scratch the paper or wood instead of marking them. The true English pencils are formed of black lead alone, sawed into slips, which are fitted into a groove made of the softest wood, as cedar, and another slip of wood glued over them. These pencils, however, are of different quality, on account of different sorts of the mineral being fraudulently joined together in one pencil, the fore-part being commonly pretty good, and the rell of an inferior kind. To avoid these inconveniences, some take the finer pieces of black lead itself, which they saw into slips, and fix for use in port-crayons. *Lewis's Commerce of Arts*, p. 328.

By our laws, entering mines of black lead, with intent to steal it, is made felony. See 25 Geo. II. c. 10. See **LARCENY**.

**LEAD**, for the *manufacture of*, see **PLUMBERY**.

There are various preparations of lead, serving for various purposes, some of which are now disused, and others, under one form and name, or another, still continued.

**LEAD, Balsam of,** an external medicine, formerly famed for its effects in old and sharp ulcers. It is made by mixing one ounce of sugar of lead with two of oil of turpentine, and setting this mixture in a sand-heat till the salt is dissolved. By this means the oil acquires a red colour, and is called balsam of lead.

**LEAD, Burnt, plumbum ustum,** is a chemical preparation used in medicine, made of plates of lead, melted in a pot with sulphur, and reduced by fire into a brown powder.

Lead continued in fusion and stirred, so that fresh surfaces may be exposed to the air, will gradually change into a powdery dusky-coloured calx, bearing this name.

Burnt lead is only intended for external use. It has the same virtues ascribed to it, in ointments and plasters, as litharge or minium. Mixed into an unguent with lard alone, it makes a good ointment for the piles.

**LEAD, Butter of,** is a kind of liquid unguent made of vinegar and lead, incorporated with rosin oil, and commended for the cure of tetters. It is called *butyrum saturni*.

**LEAD, Calined, or calx of lead.** See CALX, CERUSE, GLASS OF LEAD, LITHARGE, MASSICOT, MINIUM, &c. and *Alloys of Lead*, supra.

**LEAD, Casting of.** See CASTING.

**LEAD, Cerate of Super-acetate, Ceratum plumbi super-acetatis,** the "Unguentum ceruffæ acetatæ" of P. L. 1787, is prepared in the following manner: Take of super-acetate of lead two drachms, white wax, two ounces, and olive oil, half a pint. Dissolve the wax in seven fluid-ounces of oil, then gradually add to it the super-acetate of lead, separately rubbed down with the remaining oil, and stir the mixture with a wooden lice, until the whole has united.

**LEAD, Compound cerate of.** See CERATUM lithargyri acetati compositum.

**LEAD, Cohesion of.** See COHESION.

**LEAD Dust** is a preparation used by the potters; made by throwing charcoal dust into melted lead, and stirring them a long time together: to separate the coal again, they only wash it in water, and dry it afresh. Its use is, to give a varnish and gloss to their works.

**LEAD, Extract of, or Saturn,** is prepared by simmering together as many pounds of the litharge of gold as quarts of vinegar for an hour and a quarter, and often stirring them; then taking it from the fire, and as soon as it is cool enough, pouring the clear liquor into bottles to be kept for use. If this liquor be made into the common consistence of an extract, it must boil yet longer after its separation from the mass, and will acquire a reddish colour. This is Goulard's extract (see LEAD, supra), and the basis of all his preparations of lead. It evidently differs in no respect from sugar of lead, and vinegar of litharge, but in the degree of concentration. The only circumstance in which the extract seems to have the advantage of sugar of lead, appears to be in the greater quantity of the acetous acid contained in it, which proves an excellent assistant in many cases, and the sugar of lead, when once crystallized, cannot be brought back to that state of solution in vinegar in which it was before; yet where a large quantity of watery menstruum is added, as in Mr. Goulard's saturnine water, it is as well to make a solution of sugar of lead in the water, and add the vinegar afterwards, as to mix them both together in the form of extract. Aikin's Obs. on the external Use of Preparations of Lead, &c. p. 2. See VINEGAR of Lead.

In the London Pharmacopœia of 1787, this was denominated "Aqua lithargyri acetati;" and in the last edition it is called "Liquor plumbi acetatis," or "solution of acetate

of lead," and it is directed to be prepared by mixing two pounds four ounces of semi-vitreous oxyd of lead, with a gallon of acetic acid, and boiling down to six pints, constantly stirring; then setting it by, that the feculencies may subside, and straining. This is a dense liquor, of a deep brown colour, and consists of a saturated solution of subacetate of lead. It was restored in the last Pharmacopœia, in consequence of the celebrity it had obtained under the name of "Goulard's Extract." The "Aqua lithargyri acetati composita" of P. L. 1787, called in the last edition "Liquor plumbi acetatis diluti," or "diluted solution of acetate of lead," is prepared by mixing a drachm of solution of acetate of lead, a pint of distilled water, and a fluid-drachm of weak spirit. When this mixture is made, even with distilled water, some precipitation takes place; and when, as is more common, ordinary water, containing any muriates or sulphates, is used, this is much more abundant from double decomposition, and gives the liquor a milky appearance when diffused through it. To this it owes its common name of "white wash."

**LEAD, Glass of.** See GLASS of Lead.

**LEAD, Magillery of,** is the calx of lead purified and sublimed. It is made of lead dissolved in aquafortis, pouring filtrated salt water into it; whence results a magillery extremely white, which, when softened by several lotions, is mixed with pomatums for the face and complexion.

**LEAD Mine.** See MINING.

**LEAD, Mock,** a name given to a glittering substance found in lead-mines. See GALENA inanis, and BLINDE.

**LEAD, Native.** See LEAD, supra.

**LEAD, Ointments of, Preparations of.** See UNGUENT.

**LEAD Plaster.** See EMPLASTRUM Commune.

**LEAD Pipes, Manufacture of.** The common method used for making lead pipes, consists in casting the lead upon a smooth steel mandril placed in a mould, also of metal, to form the outside. These pieces are about 18 inches long. They are afterwards joined together by a process, called *lining*.

A very great improvement has been made in the manufacture of lead pipes, by drawing them in a manner similar to wire. The lead to form the pipe is cast upon a mandril of the diameter of the inside the pipe, but of such a thickness as to equal the whole pipe in weight: it is then fastened upon one end of a cylindric steel mandril, and the lead is pulled through different sized holes, till the pipe is of sufficient length and thickness. These pipes can be drawn to the length of eight or ten feet. The power required, however, is very great, which is one objection to the method. They are also liable to flaws; for, if the casting happen to be imperfect, the imperfection is much increased and extended by the process of drawing.

This manufacture has been much improved by passing the lead upon the mandril, through grooved rollers of different sizes, following each other in succession. The power required is much less than that required for drawing; and the pipes are said to be superior in other respects. For a more particular account of this manufacture, see LEAD PIPES.

**LEAD, Red,** a preparation of mineral lead calcined and rubified; used by painters, potters, and surgeons. See MINIUM, and Oxyds of LEAD.

**LEAD, Salt or Sugar of, Saccharum saturni, Superacetat plumbi, superacetate of lead,** is an essential salt of vinegar, incorporated with the proper substance of lead, or ceruss, dissolved in spirit of vinegar. See SACCHARUM Saturni, and LEAD, supra.

**LEAD, Tincture of.** See *TINCTURA Saturnina*.

**LEAD, Vinegar of, or of Libarge.** See *VINEGAR*.

**LEAD, Water of, Aqua Saturni,** is called by Mr. Goulard vegeto-mineral water, who makes it by dropping into a quart of pure water a hundred drops of the extract of saturn, and then adding to them four tea-spoonfuls of brandy. This is his specific in external inflammations, particularly of the eye, for washing ulcers, cancers, serofulas, contusions, phlegmons, erysipelas, piles, chilblains, tetters, gaugrences, &c. But a solution of the saccharum saturni will have the same effect.

**LEAD, White.** See *CERUSE*, and *LEAD, supra*.

**LEAD Nails.** See *NAILS*.

**LEAD,** in the *Manege*, is a term used to express the part that begins any motion first. A horse going in a straight line always leads, or cuts the way with his right foot. This is called in French *entraier le chemin*.

**LEADWORT,** in *Botany.* See *PLUMBAGO*.

**LEADERS,** in the *Military Art.* See *FILE-leaders*,

*LEÛNA*, the lioness. See *LIONESS*.

**LEAF, (FOLIUM,)** in *Botany* and *Vegetable Physiology*, is a very general, but not universal, organ of the herbage of plants, of the first importance to vegetable life, being, in many respects, equivalent to the lungs of animals; inasmuch that when leaves are not present in the usual manner, their office must be performed by some other part, which is generally the stem. Leaves are, for the most part, remarkable for their expanded form, in which the object of nature is manifestly to present to the atmosphere as wide an extent of surface as possible, greatly exceeding that of all the rest of the plant. "Their colour is almost universally green, their internal substance pulpy and vascular, sometimes very succulent, and their upper and under surfaces commonly differ in hue, as well as in kind or degree of roughness."—How great a share the foliage of plants has in contributing to the beauty of the vegetable creation, and how widely their utility extends, in the sustenance they afford to the animal world, not to mention their various economical uses to mankind, is too evident to require much illustration. Their curious functions, and their real use to the plant that bears them, has not till lately been properly understood or justly appreciated. The science of chemistry was, for a long time, not sufficiently advanced to throw the necessary light upon this subject; and even at the present day, when applied to the physiology of vegetables, it serves rather to help us to conceive what *may be*, than to see clearly what *is*, transfused in their apparently simple, but truly elaborate, frame.

The first who attempted to reason upon the uses and properties of leaves was Cæsalpinus, who merely supposed them a sort of clothing, or protection against cold and heat. It is not worth staying to consider his reasons, for an opinion which is so inadequate to what it attempts to explain. This writer conceived the foliage of plants to originate from, or to be, a sort of expansion of, their bark.

Some of the first practical observations that tended to discover the importance of leaves, were made by gardeners, who, in their various treatment of fruit trees, soon found they were not to be stripped of their leaves, even partially, without caution, and that a general injury to the foliage infallibly ruined the fruit. They have also universally discovered, by experience alone, the benefit of removing decayed or sickly leaves; which all books on gardening have never failed to inculcate, though the writers had no idea of the manner in which the morbid secretions, or corrupted exhalations, of these bodies, might injure the growing plant.—

When gooseberry or currant bushes are stripped of their leaves, by the voracity of caterpillars, every body knows that the fruit, if not withered, is altogether tasteless. We cannot even yet precisely trace the mode in which this effect is produced, except that it evidently arises from a great, though only temporary, injury to the constitution of the shrub, caused by its premature and violent desolation. This injury is repaired in the ensuing season.

The absorption and perspiration of leaves could not long remain unobserved, when these organs came to be considered with any philosophical attention. Hales and Bonnet have made the best and most numerous experiments on this part of their functions. The former first suggested the probability of their imbibing air as well as moisture, nor did the action of light upon them escape his sagacity, though subsequent chemists and physiologists have pursued these subjects to a far greater extent. The fading of a leafy branch of any plant when gathered, and its revival, on being immersed for a short time in water, sufficiently evince the perspiring and absorbing powers of the leaves. Dr. Hales first determined the proportion of each, by experiments upon the great annual sun-flower, the vine, cabbage, &c. On the first-mentioned plant he bestowed particular attention, and the result of his observation was that it lost 1lb. 14 oz. weight in the course of a hot dry day, but in a dry night only three ounces. In a rainy night it gained two or three ounces by absorption. The surface of the plant, compared with that of its roots being, as nearly as could be calculated, in the proportion of five to two, it follows that the daily absorption by the roots was so much the more rapid, in order to make up the loss which took place in the herbage. Compared with the ordinary insensible perspiration of the human body, that of the sun-flower is only as 15 to 50; but the bulk or solid substance of the two being extremely different, that of the vegetable being so much more dilated, it is found the latter perspires seventeen times more, in proportion to its bulk, than the human frame. These proportions of course vary in both, according to circumstances. If the roots be plentifully watered, the evaporation by the leaves is the more copious and rapid. In newly removed plants, the absorption by the leaves supplies the wants of the vegetable body, till the roots have shot forth new fibres in order to obtain moisture in that their natural direction; but if such plants be immoderately watered, they may be killed by excess of moisture; for no evaporation by the leaves being allowed to take place, nothing can be imbibed by the roots. In certain states of the atmosphere, some plants are frequently exhausted by their perspiration, and droop for want of adequate supplies from the roots; while others are so constructed as to perspire very slowly, and therefore to resist the effects of the most parching air or sun. Such is the nature of the cuticle that covers the leaves of aloe, and of all succulent plants, more or less, that although they perspire but very slowly, they absorb with great facility. Hence these plants are admirably adapted to thrive on dry sunny rocks, or amid the moist and sandy deserts of Africa, where the rare and trivial supplies of rain which fall to their lot during a great part of the year, prove sufficient for their support in consequence of their tardy perspiration. It is truly worthy of remark, that this difference, in their powers of imbibing and giving out moisture, exists only while these plants retain their living principle. When killed by the application of great heat or cold, their leaves dry as quickly as any bodies of equal thickness. Evergreens are found to perspire much less than other shrubs, while the *Cornus mascula*, or Cornelian cherry, a plant with a thin dry leaf, was

found by Du Hamel to perspire to the amount of twice its whole weight in 24 hours.—See PERSPIRATION OF PLANTS.

The best observations on the absorbing power of leaves, and its difference in different plants, have been made by Bonnet, and are recorded in his book entitled *Recherches sur l'Usage des Feuilles*. By laying good, healthy, full-grown leaves of various herbs or trees upon the surface of water, some with the upper, and others of the same species with the under, side applied to the water, he observed in which situation they continued longest in health and vigour; and also how far different species differed from each other in this respect. In general, herbaceous plants sustained the longest this continual and copious application of wet to their upper surface, while various trees on which the same experiment was made, decidedly preferred absorption by their under side.

The absorption and evaporation in the leaves of aquatic plants; whether, like many species of *Potamogeton*, as well as the *Zannichellia*, the *Chara*, and all the submerged *Algae*, they are entirely under water; or whether, like the *Nymphaea*, they float on its surface; appear in general to be very rapid; such plants, however juicy, drying with great rapidity when taken into the air. They are, for the most part, highly vascular, and, no doubt, have an equal facility in imbibing and in giving out water.

Although most leaves are so formed as to have decidedly an upper and an under surface, the sword-shaped plants (see ESSAYS) are an exception. Their foliage is vertical, and has little or no upper surface, except where it embraces the stem; what is analogous to the under side of ordinary leaves, being in fact so circumstanced in these, as to constitute their whole surface. Other leaves are by cylindrical, that no difference of sides can be traced. In all these the absorbing vessels and the perspiring ones must be dispersed alike over the whole expansion of the leaf; as they are over stalks, and especially over the stems of plants that have no leaves at all, in which nevertheless all the known functions of leaves necessarily take place. This latter is the case in the whole genus *Staphelia*, and in many species of *Cistus*, as well as in several rush-like plants, and those singular productions the *Cuscuta* and *Cassipha*.

There are, in a very few instances, strange aberrations of configuration in leaves, declined to the accomplishment of some particular purpose. Thus, those of the *Dionaea*, (see that article,) bear an appendage like a rat-tail, the toothed lobes of which, when stimulated, close upon each other, and imprison any insect that may have happened to alight upon them. The leaves of the *Sarracenia* are tubular, and those of the *Nepenthes* bear each a tubular appendage with a lid. These are found for the most part full of water, that seems to be secreted or poured out by the vessels of the leaf, rather than received, as has commonly been supposed of the *Sarracenia*, from the atmosphere. This water is the resort of insects, who mostly perish in it, and the materials of their decomposing bodies are supposed to minister to the health of the plant. The *Drosera*, found in our bogs, entrap insects by the viscid and irritable hairs of their leaves, apparently for a similar purpose.

This leads us to consider the effects of air and light upon vegetables, through the medium of their foliage, which, in this point of view, is transcendently important.

Grew and Malpighi, independent of each other, but about the same period, detected, in the leaves of plants, abundance of vesicles full of air, as also the spiral-coated tubes or vessels of the stems, considered by their discoverers,

as well as by subsequent physiologists till very lately, in the light of air-vessels likewise, because, like the arteries of the animal frame, they appeared, on dissection, to be empty, or at least not occupied by the sap or juices of the plant. On the detection of these vesicles, physiologists theoretically supposed leaves to imbibe air, "which the spiral vessels were believed to convey all through the plant, in order that it might act on the sap as it does on the animal blood. The analogy thus understood was not correct, because air is conveyed no further than the lungs of animals; but without this hypothesis no use could be found for the supposed longitudinal air-vessels." Now it is proved that these longitudinal spiral-coated tubes do really transmit the sap from one part of the vegetable frame to another, finally conveying it into the leaves, where it is acted upon by the air, either of the above-mentioned vesicles, or of the atmosphere. The analogy with animal respiration holds good, therefore, much more correctly than the authors of the above hypothesis imagined. On this subject we need not repeat what is said under the article CIRCULATION of the Sap.

Dr. Hales's experiments with the air-pump, to prove the transmission of air through the vegetable body, are to be regarded with caution, as merely showing that air will pervade their longitudinal vessels, when a branch is cut, and its vital principle probably in some degree injured; at least when the natural movement of its sap is by no means going on, nor that fluid remaining in its natural situation. Air is obtained in abundance, by means of the air-pump, from every part of the vegetable body, as well as from recently extracted sap; and plants are found to perish very soon in an exhausted receiver. Hales rightly remarked, that air is not only taken in by plants very copiously along with their food, but also imbued by their bark, as well as through the surface of their leaves. Yet we cannot follow him when he adds, "especially at night, when they are changed from a perspiring to a strongly imbibing state." Such a difference between night and day seems merely to regard the watery absorption and perspiration of leaves, the introduction of air, or rather its action upon them, being doubtless carried on chiefly in the light, that body having a principal share in the result. Nor did this escape the sagacity of Hales, who, after concluding that "one great use of leaves is to perform in some measure the same office for the support of the vegetable life, that the lungs of animals do, for the support of the animal life; plants, very probably, drawing through their leaves some part of their nourishment from the air:" adds two pages further; "and may not light also, by freely entering the expanded surfaces of leaves and flowers, contribute much to the ennobling the principles of vegetables?"

Bonnet's experiments and enquiries, respecting leaves, principally elucidate their absorbing powers, proving them to be "furnished with a system of cuticular absorbents, which carry fluids into their sap-vessels, so as to enable them, in some degree, to dispense with supplies from the root." This philosopher has not improved upon the ideas of Hales, respecting the effects of air or light upon plants. He does not appear to have had any conception of leaves imbibing air and giving it out again; still less of their effecting any change in its properties. He was not aware that the bubbles he observed clinging to leaves, whether dead or living, when placed under water, and exposed to a bright sun, were separated, by the action of light, from the water itself; so that he has no right to be considered as the discoverer of the expiration of plants.

The great Dr. Priestley first pointed out a property in  
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growing vegetables, of absorbing carbonic acid gas, denominated by him fixed air, by the upper surface of their leaves, and of giving out by their under surface oxygen gas, or pure respirable air. Dr. Ingenhoufz improved upon this important discovery, by observing light to be necessary to these functions, remarking that in the dark leaves give out a bad or carbonic air, and that fruits and flowers almost invariably give out the last-mentioned kind of air, at all times, but especially in the dark. Aquatic or bog plants, as the *Epilobium* and *Nymphaea*, were found by these philosophers to excel remarkably in this faculty of purifying air, or of changing it from a carbonic to an oxygenous nature. This operation is, in most cases, performed very quickly. A vine-leaf in an ounce phial of carbonic acid gas, that immediately extinguished a candle, being set in the sun, without water, changed it to pure respirable air in an hour and a half. Dr. Priestley found some of the bog-plants to alter even unmix'd inflammable air, or hydrogen. Succulent leaves afford most of the purified air in question, because of the abundance of their cellular parenchymatous substance, in which the chemical operations of leaves are performed, and in which their green colour chiefly resides. This colour therefore does not exist in leaves never exposed to the light, in which consequently no such chemical operations ever take place. The sickly white observable in that part of celery stalks, or of the sprouts of asparagus, indeed of all plants, which is under the surface of the ground, is entirely owing to the absence of light; for when exposed to light such parts become green like the rest of the herbage. It is found that exposing plants to the action of hydrogen gas will produce the same green colour, even if they are kept in the dark.

Every person attentive to the growth of plants must have observed the constant direction of the upper surface of their leaves towards the light. When the situation of branches nailed to a wall is altered, and the position of their leaves disturbed, the latter resume their natural posture in a day or two, and the more speedily in proportion to the brightness of the weather. It has long been known that light acts beneficially upon the upper surface of leaves, and hurtfully upon their under side; for if the latter be repeatedly turned to the light, or forcibly kept in such an unnatural position, the leaves grow sickly, black or discoloured spots appear about the veins at their backs, and the cuticle scales off. Thus we have seen the *Magnolia grandiflora*, whose rigid leaves do not readily change their posture, very materially injured, by nailing it to a wall in hot and bright weather. The under surface of its foliage became spotted, and the colour of the other side sickly; the leaves fell prematurely, and the plant was long in recovering its health. One great use of footstalks to leaves appears to be to facilitate their turning to the light, and varying their position as the sun pursues his course; as may be seen in clover and other papilionaceous plants more especially. Leaves separated from their parent branch, and suspended delicately by a fine thread, turn to the light as effectually as if in their natural situations. This power, however, of turning to the light, is not equally obvious in all leaves. Such as are very much folded or plaited, necessarily presenting, on that account, about an equal portion of their surface to the sun in every position, are often less moveable; and this may account perhaps for the insensibility observed by Bonnet in the mallow. Sword-shaped leaves are always vertical, and do not alter their position. Those of the papilionaceous tribe are, as we have already hinted, among the most sensible. Light seems, in many instances, the sole

cause of their expansion, for when it is withdrawn, they fold together and droop as if dying; such a state of relaxation being very elegantly, and indeed, as it appears, very correctly, termed by Linnæus the sleep of plants, on which subject he has left us a curious dissertation in his *Annotates Academicæ*, v. 4. p. 333. He there justly remarks that the general aspect of a field, a garden, or a hot-house, is wonderfully changed during a summer's night in Sweden, so as to puzzle the most experienced botanist, owing to a general alteration in the posture of the foliage of plants. Some fold the two sides of the leaf together; others turn their leaves upward, so as to enclose the flowers, which they thus shelter from nocturnal dews that might interfere with their impregnation; and many press their foliage downwards, close to the stem or branch, whose buds they thus perhaps protect from cold. Such movements evince a portion of that irritability, dependent on life, which is more strikingly displayed in the sensibility of some leaves to the touch of any extraneous body. Several species of *Mimosa*, called for that reason sensitive plants, as well as a few others of different genera, fold up their leaves when any concussion is given to the plant. If any of their leaflets be shaken or injured, the irritation is communicated to the neighbouring ones, and thence, with accelerated velocity, to the rest, even to other leaves on the same branch or root. The leaves of the *Hedyfarum gyrans* of Bengal are remarkable for a spontaneous movement, apparently independent of external stimulation. They are ternate, and their small lateral leaflets move frequently, but irregularly, up and down, independent of light, requiring only, for the performance of this action, a warm and still air. This, like all other movements of leaves, is most conspicuous in such as are young.

In consequence of the observations of Priestley and Ingenhoufz, confirmed, variously extended, and explained upon the principles of improved chemistry by succeeding philosophers, the effects of light, heat, and atmospheric air upon leaves, and, where these are wanting, upon the green stems of plants, are now, as far as concerns all vegetables in common, tolerably well understood. It is agreed that in the day-time the parts in question imbibe from the atmosphere carbonic acid gas, which they decompose, absorbing the carbon as matter of nourishment, which is added to the sap, and emitting the oxygen. Plants absorb the same gas from water, when by the action of light it is separated from that fluid. Air contaminated with this gas by the burning of a candle, or the breathing of animals, serves therefore as food for vegetables, who in their turn purify it again, and render it fit for the support of animal life, by the oxygen given out from their leaves under the influence of light. Hence arises a mutual and essential dependence of the animal and vegetable kingdoms on each other, for the discovery of which, one of the most curious and beautiful in natural philosophy, we are principally indebted to Dr. Priestley, that great name from which fanaticism would gladly tear, if it could, even the laurels of science.

The above view of the functions of leaves exactly coincides with Mr. Knight's theory of vegetation, of which we have given an outline in our article *CIRCULATION of the Sap*. That gentleman has proved, that very little albumen, or new wood, is secreted when light is kept from the leaves. We are also thus enabled to understand how essential oils may be produced, which, as well as sugar, are known to be composed of oxygen, hydrogen, and carbon in different proportions. The various modifications of mucilage, detected and distinguished in the vegetable body by modern chemistry, are perhaps, as more dependant on the vital principle for  
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their formation, more inexplicable by chemical laws. It is perhaps in vain to attempt to explain how any particular secretion is elaborated. Still less can we comprehend how different tribes of plants, growing in the same soil, even vegetating in the same distilled water, should regularly produce, as far as the health of the individuals under experiment will allow, their own peculiar secretions, ever preserving the most essential qualities of their species in this respect. How the nutritious sap, originally similar in these different plants, can be so operated upon, by the very same agents, in the thin and tender structure of the different leaves, as to produce substances so totally unlike each other as we meet with in plants, whence their various flavours and qualities originate; all this is inexplicable in our present state of knowledge, though transacted every moment before our eyes. The different secretions in various organs of the same individual vegetable body; the acrimony of the leaf, the bitter of the bark, the perfume of the blossom, the sweetness and acidity of the fruit; all these are no less wonderful. We understand enough indeed to conceive how the rest may be accomplished, and may congratulate ourselves on being allowed even a glimpse of those mysteries of nature, which our finite powers are inadequate fully to comprehend.

Having said so much on the physiology of leaves, it is necessary to consider them in another point of view, for the purposes of scientific botany. In discriminating the species of plants a knowledge of the various forms of leaves is of the utmost importance, nor are they entirely useless in the discrimination of natural tribes or orders. It is universal with grasses and the orchis family to have simple and undivided leaves; it is nearly as general for the papilionaceous or leguminous tribe to have compound ones. In some orders they are always opposite, in others alternate; in some genera evergreen, in others deciduous; but these latter circumstances are liable to various exceptions. Trees and shrubs of North America, and even those of Europe, generically related to them, have a general tendency to assume very brilliant colours in their foliage, as it verges towards decay. Grasses, on the other hand, are very uniform and constant in their green colour, which is seldom changeable. Evergreen leaves are commonly darker coloured, though more shining than others, and will often thrive with a less proportion of light than is necessary for other trees. The lower leaves of herbs that grow in lofty and windy stations, are frequently much less divided than the upper ones, while the reverse is the case with most aquatic plants, whose lower leaves, immersed in the water, are sometimes quite capillary, while the uppermost are broad, and float on its surface; witness the *Ranunculus aquatilis*, whose white flowers bespangle our ponds in summer. The action of a running stream appears to elongate the leaves of this, as well as of many other plants. The dilated form of leaves in general, by which they present so large a surface to the atmosphere, causes them to be the more easily dislodged by autumnal storms, when their connection with the branch or stem has already become gradually loosened by their approaching decay. See DECIDUOUS, and FALL of the Leaf.

Leaves are, in the first place, to be considered as to their situation and position.

*Folia radicalia*, radical leaves, spring from the root, as in the Primrose and Cowslip; *caulina*, stem-leaves, grow on the stem, as in the White Lily; *ramæ*, branch-leaves, if different from those of the main stem, require to be distinguished from them, as in Purple Cow-wheat, *Melampyrum arvense*.

*Alterna*, alternate leaves, stand solitarily on the stem or branches, as in Willows and many common plants; *opposita*, opposite ones are found in the Lilac, and many others equally common; *sparsæ*, are scattered without any order, as in the Orange and White Lilies; *confertæ*, are crowded together, as in the *Rhododendron* and *Azalea*.

*Bina*, are only two upon a plant, like those of the Lily of the Valley; *ternæ*, stand three together, as in the sweet *Verbena triphylla*, and often in the *Fuchsia*; *quaternæ*, *quina*, *sexa*, &c. are when four, five, six, or more, surround the stem in a whorl, as in some kinds of Heath; *verticillata*, whorled leaves, used without any reference to the number; expresses this mode of growth, as exemplified in the Wood-ruff, Madder, and many plants of the same as well as different families.

*Fasciculata*, tufted leaves, are seen in the Larch and Cedar; *imbricata*, lying like tiles upon a house, in the Common Ling; *decussata*, stand in pairs crossing each other, as in the Caper Spurge, *Euphorbia Lathyris*; *disticha*, two-ranked, spread in two directions, yet are not regularly opposite at their origin, as in the Yew; *secunda*, are unilateral, leaning all toward one side, as in the Solomon's Seal.

*Adpressa* are closely pressed to the stem, as in some kinds of *Xanthanum* and Spurge, in which case the back of each leaf only is presented to the light; *verticalia*, stand perpendicularly, with both sides equally at right angles with the horizon, like the *Laëuca Scariola*, but such a case is rare, except in sword-shaped leaves; *erecta*, are such as grow nearly upright, forming a very acute angle with the stem; *patentia* spread more in the usual manner; *horizontalia*, or *patentissima*, spread in the greatest possible degree; *reclinata* incline downward, the extremity of each being lower than the base, or point of insertion; *recurva*, are curved backward, as in *Erica vertora*; *incurva*, turn inward, as in *E. imperialis*; *obliqua*, are twisted, so that one part is vertical, the other horizontal; *reflexinata*, are so completely turned or reversed that the upper surface is become the under, as in *Aframoria peregrina*; *depressa*, are radical leaves pressed close to the ground, like the Hoary Plantain, *Plantago media*, or any succulent ones that are vertically flattened, in opposition to *compressa*, flattened laterally; *natantia*, float on the surface of water; *immersa*, *immersa*, or *submersa*, are plunged beneath it; *emorsa* are raised above the water, others upon the same plant being sunk below its surface.

The insertion of leaves means the mode in which they are connected with the parent plant.

*Petiolata*, stand on footstalks (*petioli*) either long or short, simple or compound; *petiata*, have the footstalks inserted, not into the base as usual, but into the middle of each leaf, like the arm of a man holding a shield, as in the Common Nauturium or *Tropæolum*; *sessilia*, sessile leaves, spring immediately from the stem, branch or root, without any footstalk, of which examples are frequent; *amplexicaulia*, clasp the stem with their more or less dilated base, being usually alternate; *connata*, or *connato-perfoliata*, are opposite leaves, united at the base, so that the stem runs through them; *perfoliata*, have the stem running through them in any way whatsoever, as *Eupleurum perfoliatum*, called Thorough-wax, from *coax* to grow, in allusion to this circumstance; *vaginantia*, are such as sheath the stem, or each other, with their base, which is exemplified in most grasses, and many liaceous plants that have no stem; *equitantia*, embrace each other with their compressed base, while they spread upwards in two ranks, of which the genus *Iris* affords many examples; *decurrentia*, decurrent,

run down the stem or branch in a leafy border or wing, as in many Thistles, and the Great Mullein; *florifera*, bear the flowers out of their disk or margin, as in *Rufcus* and *Xylophylla*.

With regard to form, the first thing to be considered is whether leaves are simple (*simplicia*) or compound (*composita*). Of the former kind are those of grasses, Orchises and Lilies, which are not only simple but undivided, while those of the Vine and Mallow are simple, but lobed; the Hop bears some leaves lobed, others undivided, as does *Laurus Sassafras*, and the Paper Mulberry. Compound leaves are observable in Roses, Jasmine, and the Un belliferous tribe in general, and consist of leaflets, or partial leaves, (*foliola*.) connected by a common stalk, and falling off along with it. In compound leaves the footstalk is either simple, as in the Jasmine and Rose, or compound, as in Parsley, Hemlock, and Fumitory. "In simple leaves the footstalk, if present, must of course be simple, while in compound ones it must always be present, though not always subdivided."

The following are the principal forms of simple leaves, considering their outline only.

*Orbiculatum*, as nearly a perfect circle as possible, of which infancs are very rare,

*Subrotundum*, roundish, is not uncommon.

*Ovatum*, the shape of an egg cut longitudinally, a very common form of leaves.

*Obovatum*, is the same figure reversed, the little end being downward.

*Ellipticum*, oval, of an equal breadth at each end.

*Oblongum*, of an indeterminate oblong shape, three or four times longer than broad.

*Spatulatum*, roundish, or obovate, with a long taper base, like a surgeon's spatula.

*Cuneiforme*, like a wedge, broad and abrupt at the extremity.

*Lanceolatum*, lanceolate, of a narrow oblong figure, tapering towards each end, very common, as in Willows, and *Plantago lanceolata*, or Ribwort.

*Lineare*, linear, narrow with the sides as nearly parallel as possible, such as the leaves of most grasses, the various species of *Narcissus*, the Rosemary, and many different plants. Linear-lanceolate leaves are of an intermediate shape between this and the last, or but slightly lanceolate, of which the gradations are numerous, often upon the same plant.

*Acrosum*, needle-shaped, linear and evergreen, mostly acute and rigid, almost peculiar to the Fir and Juniper tribe. Such leaves have usually a joint where they unite with the branch, at which they separate from it when they fall.

*Triangulare*, having three prominent angles, of whatever measurement or direction, as in Goosefoot, and some leaves of Ivy.

*Quadrangulare*, having four angles, as in the *Liriodendrum* or Tulip-tree, a very peculiar kind of leaf.

*Quinquangulare*, with five angles, like the Cyclamen, and Ivy.

*Deltoides*, deltoid, or trowel-shaped, having three angles, of which the terminal one is much further from the base than the two lateral ones, as in *Chenopodium Bonus-Henricus*. Linnæus in his *Philosopha Botanica*, p. 43, cites his fig. 58. of that work as an example of this leaf, which is a mistake, that figure being a representation of the succulent three-edged leaf, (*fol. trigonum*.) of *Mesembryanthemum deltoides*.

*Rhombicum*, rhomboid or diamond-shaped, approaching to a square, though the sides are scarcely ever equal. This is seen in *Trapa natans*, and the Stinking Goose-foot.

*Reniforme*, kidney-shaped, a short broad rounded figure, hollowed out at the base, as in *Afarabacca*.

*Cordatum*, heart-shaped, ovate hollowed out at the base, according to the vulgar idea of a heart; a form very frequent in leaves.

*Lunulatum*, crescent-shaped, like a half-moon, whether the points be directed backward, as in *Sagittaria obtusifolia* when its leaves are shorter than usual, or forward, as in *Pastiflora lunulata*, Sm. Ic. Pic. t. 1.

*Sagittatum*, arrow-shaped, like *Sagittaria sagittifolia*, and several species of Sorrel, *Rumex*. In the Great White Bindweed, *Convolvulus sepium*, the posterior angles are abrupt or lopped.

*Hastatum*, halberd-shaped, triangular, hollowed out at the base and sides, the lower lobes spreading horizontally, at right angles with the footstalk, as in Sheep's Sorrel, and the upper leaves of the Woody Nightshade, *Solanum Dulcamara*.

*Muriforme*, fiddle-shaped, oblong, blunt and dilated at each end, hollowed out at each side, of which remarkable figure the Fiddle Dock is a striking, and almost singular example.

*Runcinatum*, runcinate or lion-toothed, that is *re-uncinatum*, hooked backward, being cut into many transverse acute segments, whose points are directed backwards, like the Dandelion.

*Lyratum*, lyrate, so named in allusion to the antique lyre, but reversed. This leaf has a broad rounded extremity, with several transverse rounded segments, gradually lessening towards its base, as in *Erythronium Barbara*. It is most frequent in the Cruciferum and Compound classes, and by an occasional deep separation of the segments, often becomes a compound or lyrate-pinnate leaf.

*Fissum*, cleft or split, when the margins of the fissures and segments are straight, not rounded, as in the Ginkgo or Maidenhair-tree. *Bifidum*, *trifidum*, *multifidum*, &c. express the number of the segments, but these terms are also used with less limitation, to indicate the number of divisions, of whatever shape, when the latter circumstance does not come under consideration.

*Lobatum*, lobed, when the margins of the segments are rounded, as is most generally the case; witness the Hepatica. *Bilobum*, *trilobum*, &c. indicate the number of the lobes.

*Sinuatum*, sinuated, cut along the margin into deep, rounded, or wide openings, like *Statice sinuata*, *Mesembryanthemum pinnatifidum*, Curt. Mag. t. 67, and the Common Oak.

*Partitum*, deeply divided, almost to the base, like the Musk Mallow. *Bipartitum*, *tripartitum*, *multipartitum*, express the number of divisions.

*Laciniatum*, lacinated, cut, or as it were torn, into numerous irregular portions, which may be seen in various species of *Senecio*, denominated on that account Ragwort.

*Incisum* and *Dissectum*, cut or jagged, are nearly synonymous with the last, but express a less deep division of the whole leaf.

*Palmatum*, palmate or hand-shaped, cut into several oblong, nearly equal or uniform segments, about half way, or rather more, towards the base, leaving an entire space there, like the palm of the hand, as in the common Blue Passion-flower, whose leaves however are frequently still more deeply divided, and the Fig.

*Pinnatifidum*, pinnatifid, or wing-cleft, cut transversely into several oblong parallel segments, like several species of Thistle, *Carduus*, and on a smaller scale, though more deeply,

deeply, *Lepidium petreum* and *alpinum*; as well as *Coronopus didyma* of Fl. Brit.

*Bipinnatifidum*, doubly fo divided, as in the Long Rough-headed Poppy, *Papaver Argemone*, and *Eriocaula major*; see that article.

*Pinnatum*, pinnate, a fine and elegant sort of pinnatifid leaf, whose segments are so narrow and so regularly parallel, that they resemble the teeth of a comb, exemplified in the Water Violet, *Hoitonia palustris*.

*Inaequalis*, unequal, sometimes called oblique, is when the two halves of a leaf are manifestly unequal in dimensions, especially at the base, where they are not at all parallel. This is the case with most species of *Eucalyptus* and *Begonia*, but it is hardly observable in any British plants, except in a small degree.

*Integrum*, undivided, expresses a leaf or leaflet being destitute of all segment, division or lobe, without any reference to its margin, whether toothed or not.

The various terminations of leaves are thus distinguished.

*Folium truncatum*, an abrupt leaf, has the extremity cut off, as it were, transversely, by a straight line, as the Tulip-tree, *Liriodendrum tulipifera*.

*Praerorsum*, bitten, or jagged-pointed, is blunt with various irregular notches, a very unusual termination, but characteristic of Dr. Swartz's genus *Aerides*, a tribe of Indian *Orchideae*. *Hibiscus praerorsus*, Linn. Suppl. has a more dilated leaf with a similar termination.

*Retusum*, retuse, blunt with a broad shallow notch, like the Mountain Sorrel, *Rumex digynus*.

*Emarginatum*, emarginate or nicked, having a small acute notch at the summit, which is not uncommon.

*Obtusum*, blunt, terminating in a segment of a circle, like the Primrose leaf, and many others.

*Acutum*, sharp, ending with an acute angle, as is still more usual.

*Acuminatum*, pointed, having a taper point, like many grasses, and various other plants.

*Obtusum cum acumine*, blunt with a small point, like the Sea Lavender, *Statice Limonium*.

*Mucronatum*, or *Cuspidatum*, sharp-pointed, tipped with a rigid or pungent spine, like the Thistle tribe.

*Tridentatum*, three-toothed, when there are three terminal, nearly equal, points.

*Tricuspidatum* expresses the same thing.

*Cirrosium*, cirrose, tipped with a tendril, as in *Gloriosa* and *Flaellaria*, two Indian plants.

The different margins of leaves are defined as follows, and are very important to be well understood, and correctly applied, in forming specific characters of plants.

*Folium integerrimum*, an entire leaf, is destitute of all marginal teeth, notches or incisions, as in the *Orchelis* and *Lily* tribes. This term, alluding solely to the margin, has no reference to, or comparison with, *integrum*, which concerns the general figure, or disk, of the leaf.

*Spinosum*, spinous, beset with prickles, though otherwise perhaps entire, as in *Thistles*, and *Eryngos*. The veins and ribs are spinous in some kinds of *Solanum*, and many *Roses* and *Brambles*.

*Inermis*, unarmed, is opposed to spinous.

*Glandulosum*, glandular, bordered with pores that exude some peculiar fluid, as in *Salix pentandra*, the Bay-leaved Willow, and some others.

*Ciliatum*, fringed, bordered with soft parallel hairs, as in *Rhaleadendrum birtutum*.

*Cartilagineum*, cartilaginous, having a hard or horny edge, like several species of *Saxifrage*.

*Dentatum*, toothed, beset with directly projecting teeth,

of its own substance, as in some species of *Plantain* and *Hawkweed*.  
*Denticulatum*, finely toothed, is much more usual than the last.

*Serratum*, serrated, having sharp teeth pointing forward, like those of a saw, either in a simple row, like the *Nettle*, or with smaller intermediate serratures, as in the *Strawberry tree*, (*Arbutus Unedo*.) various *Roses*, and others. Such leaves are called *duplicato-serrata*, doubly serrated.

*Serrulatum*, minutely serrated, is used when the teeth are very fine, even so minute perhaps as to be scarcely perceptible but by the touch.

*Crenatum*, notched or crenate, when the indentations are blunted or rounded, and not directed towards either end of the leaf, which may be seen in *Ground-ivy*, and several *Saxifrages*, some of which are sharply crenate. The two British species of *Salvia* are examples of doubly crenate leaves.

*Erosum*, jagged, irregularly cut or notched, like some species of *Senecio* or *Ragwort*.

*Repandum*, wavy, bordered with small projections and shallow segments of circles alternately, as in *Fringed Water-lily*, *Menyanthes nymphaeoides*.

*Revolutum*, revolute, turned or rolled backwards, as in *Rosemary*. As this term always regards the margin only, in modern botanical phraseology, it is needless to lay marginic revolutum.

*Involutum*, involute, is the reverse of the last, as in *Butterwort* (*Pinguicula*).

*Conduplicatum*, folded, when the margins are clasped flatly together, as in *Rosacea purpurea*, Sm. Exot. Bot. t. 108, and the bases of sword-shaped leaves.

Terms descriptive of the surfaces of leaves, no less requisite to be clearly understood than the former, are as follows.

*Folium glabrum*, a smooth leaf, is used in contradistinction to all kinds of hairiness or pubescence.

*Laeve*, smooth and even, is opposed to all kinds of roughness and inequality whatever. Thus, the blistered leaf of a cabbage is *glabrum*, but not *laeve*; that of an *Orchis*, or of *Myrtle*, is both.

*Nitidum*, polished, smooth and shining, like *Laurel*.

*Viscidum*, viscid, exuding a clammy juice, as in *Butterwort*.

*Verrucosum*, warty, besprinkled with hard tubercles, like the *Pearly Aloe*, or some species of *Echium*; the warts of the latter mostly bearing rigid bristles.

*Papillosum*, papillary, covered with softer tubercles, like the *Ice-plant*.

*Scabrum*, rough to the touch, from any little rigid inequalities, opposed to *laeve*.

*Aasper*, is a greater degree of the last, of which one of the most eminent examples is *Symphytum asperinum*, Sims in Curt. Mag. t. 929.

*Hispidum*, bristly, beset with rigid or pungent bristles, like the *Borage*.

*Urens*, stinging, when each bristle discharges a venomous irritating fluid, as in the *Nettle*; see *Pilus* under the article *FULCRA*.

*Hirtum*, or *Pilosum*, hairy, clothed with soft hairs.

*Tomentosum*, downy, very soft to the touch, as in the *Marsh Mallow*, and others of that tribe.

*Villosum*, shaggy, clothed or besprinkled with long shaggy hairs, like *Hieracium villosum*, and others.

*Lanatum*, woolly, covered with dense, entangled, often branched hairs, as in several species of *Mullein* (*Verbascum*).

*Incanum*, hoary, whether arising from close silky depressed hairs, as in *Wormwood*, and the *White-Willow*, or from

from a scaly kind of mealliness, as in *Atriplex*, and some species of *Alyssum*.

*Gluceum*, glaucous, clothed with a fine mealliness, of a sea-green colour, which easily rubs off, as in the Cabbage, the *Chlora*, and many others.

*Maculatum*, spotted, besprinkled with spots or stains of a different colour from the prevailing green of the leaf. In *Lamium maculatum* these spots are white, in *Hypocheris maculata* they are of a dark purple.

*Coloratum*, coloured, is used when a leaf, or any part thereof, is of any other colour than green, as in *Amaranthus tricolor*.

*Punctatum*, dotted, either superficially, as in *Rhododendrum punctatum*, Andr. Repof. t. 36, or with pellucid cells filled with an essential oil, like *Hypericum perforatum*, and the whole natural order of Juslieu's *Aurantia*.

*Rugosum*, rugged, having the veins tighter than the intermediate spaces, so that the latter become tumid, as in the Garden Clary, and many other species of *Salvia*.

*Bullatum*, blistery, a more remarkable degree of the last, frequent in the Garden Cabbage.

*Platum*, plaited, when the disk of the leaf, especially towards the margin, is acutely folded up and down, as in Mallows, and Ladies' Mantle.

*Undulatum*, undulated, when the disk near the margin is waved obtusely up and down, in consequence of being more ample than the adjoining part, as in *Cyamus Nelumbo*; or than the rib, as in *Reseda lutea* and *alba*.

*Crispum*, curled, when the border is so much more dilated than the disk, that it necessarily becomes curled and twisted, which is the case with the Curled Mallow, and some varieties of Mint, for this mode of growth is justly suspected by Linnæus, to be but a variety, or preternatural luxuriance.

*Concavum*, hollow, depressed in the centre, owing to a tightness in some part of the circumference, as in *Cyamus Nelumbo*.

*Canaliculatum*, channelled, having a longitudinal depression, like several species of *Narcissus*.

*Venosum*, veiny, when the vessels by which the fluids are conveyed through the leaf, are branched, subdivided, and more or less prominent, frequently forming an elegant network, in which case the leaf is said to be reticulated, either on one or both its surfaces.

*Nervosum*, or *Costatum*, (see the latter article,) ribbed, when the vessels extend in simple lines from the base to the point, or towards it. The greater clusters of vessels are generally called *nervei* or *coste*, nerves or ribs, the smaller *vene*, veins, whether branched or simple.

*Avenium*, veinless, and *Enerve*, ribless, are opposed to the last-mentioned terms.

*Trinerve*, three-ribbed, is a leaf with three great or principal ribs, all alike distinct and separate from the very base, as well as remote from the margin, like the beautiful *Blakea trinervis*.

*Basi trinerve*, three-ribbed at the base, has the base cut away, as it were, close up to the lateral ribs, as in the Burdock, and Great Annual Sunflower.

*Triplinerve*, triply-ribbed, is when the side-ribs branch off from the middle one, at some distance above the base, as in *Laurus Cinnamomum* and *Campora*, and many species of Sunflower. The fine and ample South American genus *Melastoma*, is remarkable for the conspicuous ribs of its leaves, which are usually five, seven, or more, the lateral ones either branching off from the central, or all of them distinct to the base.

*Nudum*, naked, implies that a leaf is destitute of all kinds of clothing or hairiness, as in the Orchis.

*Variegatum*, variegated, is a sort of variety or disease, in which it differs from *coloratum*, the latter being natural, and proper to the species. Variegation of leaves consists in white or yellow irregular blotches, as in the Elder, Round-leaved Mint, Holly, and *Aucuba japonica*. Such plants are usually more tender, and difficult of increase, than when in their natural state, as gardeners experience in Geraniums.

The following terms express the substance, peculiar configuration, or some other circumstance relating to leaves, not included in the foregoing lists.

*Filium teres*, or *cylindraceum*, cylindrical, is seen in *Concium gibbosum*, and some others of that genus. See **CONCIUM**.

*Semieylindraceum*, semicylindrical, flat on one side, which is generally the upper, like *Salsola frutescens*, and *Chenopodium maritimum*.

*Subulatum*, awl-shaped, tapering from the base to the point, like *Salsola Kali*.

*Tubulosum*, tubular, ho'low within, as in the Onion, and some other species of *Allium*, some Rushes, &c. The tube is double in *Lobelia Dortmanna*.

*Carnosum*, fleshy, of a thick pulpy substance, as in all those called succulent plants, belonging mostly to the genera of *Sedum*, *Craffula*, *Aloe*, *Mesembryanthemum*, &c. Of the singular power in such leaves of resisting drought, we have already spoken. When bruised they soon dry or corrupt.

*Gibbum*, gibbous, swelling on one side or both, as in *Aloe retusa*.

*Compressum*, compressed, flattened laterally.

*Depressum*, depressed, flattened vertically, as already mentioned. Various kinds of *Mesembryanthemum* exemplify these.

*Carinatum*, keeled, when the back is longitudinally prominent, like the keel of a boat.

*Ensisforme*, sword-shaped, compressed, tapering to a point, slightly convex at each side, neither of which is properly the upper or under surface; as in *Iris* and its allies.

*Auceps*, two-edged, is nearly synonymous with the last.

*Acinaciforme*, scimitar-shaped, and *Dolabriforme*, hatchet-shaped, are two kinds of succulent leaves appropriated to two species of *Mesembryanthemum*, that bear the same names.

*Trigonum*, three-edged, has three longitudinal sides and as many angles, like *Mesembryanthemum deltoides*, Linn. Phil. Bot. f. 58.

*Trigretum* differs from the last only in being more precisely applied to a three-sided awl-shaped leaf.

*Tetragonum*, four-edged, has four prominent angles, as in *Iris tuberosa*.

*Linguletum*, tongue-shaped, is a thick oblong blunt figure, generally cartilaginous at the edges, as in *Saxifraga Cotyledon*, and some of its near relations.

*Membranaceum*, membranous, expresses a thin pliable sort of leaf, the reverse of succulent.

*Coriaceum*, leathery, is thick and tough, without being pulpy or succulent, like *Magnolia grandiflora*, *Aucuba*, Laurel, and many others.

*Sempervirens*, evergreen, permanent through one, two, or more winters, so that the branches are never stripped.

*Deciduum*, deciduous, (see that article,) such as falls off at the approach of winter, as in most trees and shrubs of cold climates.

*Alienatum*, alienated, when the first leaves of a plant give place to others totally different from them, as well as from the natural habit of the genus, as in many *Mimosa* of New Holland.

*Cucullatum*, hooded, when the edges meet in the lower part

part and expand in the upper, forming a sheath or hood, of which the genus *Sarracenia* is a curious example. The Common Lime, *Tilia europæa*, is liable to a variety in which the same thing takes place accidentally. A tree of this kind, of which we have a specimen, in the church-yard of Zedlitz in Bohemia, is vulgarly supposed to bear such hooded leaves, in consequence of a parcel of monks having once been hanged upon this tree. It is seldom we can so clearly trace the cause of any variety. Some might think the experiment worth repeating.

*Appendiculatum*, furnished with an appendage, or additional organ, for some purpose not essential to a leaf, as the irritable lobes at the end of the foliage of *Dionæa missipilla*; and the pouch with a lid, upon that of *Nepenthes distillatoria*; of both which we have already treated. *Athrovanda* and *Utricularia* bear numerous bladders on their leaves under water, which seem to secrete air for the purpose of floating the plants, especially perhaps at their flowering season.

*Folia composita*, compound leaves, consist of two or any greater number of partial leaves, connected by a common footstalk, whether simple or branched. Such partial leaves are termed *foliola*, leaflets.

*Folium articulatum*, a jointed leaf, consists of one leaflet, or pair of leaflets, growing out of the summit of another, with a sort of joint, as in *Fagara tragodes*.

*Digitatum*, fingered or digitate, has several leaflets at the top of one common stalk, as in many *Potentilla*.

*Binatum*, binate, consists of a pair of leaflets only on one footstalk, as in *Zygophyllum*, some *Mimosa*, the Great Everlasting Pea, and other species of *Lathyrus*.

*Ternatum*, ternate, has three leaflets, like the Trefoil and Strawberry.

*Quinatum*, quinate, has five.

*Pinnatum*, pinnate, a very common kind of leaf, is formed of several leaflets, ranged laterally along one footstalk, either with or without partial stalks, and in an opposite or alternate manner. There is usually a terminal leaflet, as in Roses, Jasmine, and Elder, which mode of growth is called *folium pinnatum cum impari*, and is that always underlood, when nothing is particularized; *abruptè pinnatum* means that there is no such terminal or odd leaflet. Sometimes its place is supplied by a tendril, as in Vetches and Peas, and such a leaf is termed *pinnatum circosum*. *Interruptè pinnatum*, interruptedly pinnate, is when the principal leaflets are ranged alternately with one or more intermediate series of smaller ones, as in our English *Spiræa*, and *Potentilla anserina*. *Articulatè*, jointedly, is when there are apparent joints in the common footstalk, as in *Weinmannia pinnata*. In the Japanese shrub *Nandina domestica* the leaflets all separate by a joint at their base, very soon after the leaf is gathered. *Decurvisè*, decurrently, is when the leaflets run down the footstalk at their base, like *Eryngium campostre*. *Lyratè*, in a lyrate manner, has the terminal leaflet largest, the rest gradually smaller, often with intermediate leaflets, as in *Geum*, and the Turnip. This and the true lyrate leaf often vary into each other, in the same plant or species. *Verticillatè*, in a whorled manner, has the leaflets cut into fine divaricated segments, embracing the footstalk, of which the curious *Stium verticillatum*, Fl. Brit. is an instance.

*Auriculatum*, an auricled leaf, bears a pair of leaflets at its base, that often indeed unite with it, as in the *Disfucus pilosus*, and *Salvia triloba*. *Hedysarum gyrans*, the Moving Plant, mentioned above, has properly an auricled leaf, rather than a ternate one, the auricles being what move up and down spontaneously.

*Conjugatum*, conjugate or yoked, consists of one pair of leaflets, and is much the same as *binatum*. *Bijugum*, *trijugum*, *quadrjugum*, *multijugum*, express particular numbers of pairs

of leaflets, as is sometimes necessary in the specific characters of *Mimosa*.

*Pedatum*, pedate or foot-like, is in the first instance ternate, but the two lateral leaflets are compounded in their fore part, which may be seen in *Helleborus fatidus* and *H. niger*. "There is an affinity between a pedate leaf, and those simple ones which are three-ribbed at the base."

The different degrees in which leaves are compounded are thus distinguished, without any reference to the mode.

*Folium compositum* is a simply compound leaf, as in Roses.

*Decompositum*, doubly compound, is exemplified in the Gout-weed (*Ægopodium*), and many other umbelliferous plants.

*Supradecompositum*, more than twice compounded, is seen in some common umbelliferous plants, as the Hemlock, and in some *Mimosa*.

The following terms express not only the degree but the mode.

*Bigeninatum*, twice paired, and *Tergeminatum*, thrice paired, are found in some *Mimosa*.

*Èternatum*, twice ternate, is seen in *Ægopodium*, and *Tri-èternatum*, thrice ternate, in *Femaria lutea*.

*Bipinnatum*, doubly pinnate, *Tri-pinnatum*, triply pinnate, are found in many exotic leguminous plants.

Some botanists, amongst whom Forskall seems to have taken the lead, use the word *lamina* for the expanded part of a leaf, that is, for the leaf itself, so that the term is entirely superfluous, and is besides appropriated to the border of the petals in a polypetalous corolla. (See LAMINA.) What is not leaf is footstalk (*petiolus*), the part which usually supports the leaf, and whose different kinds will be explained under the article PETIOLUS. Another appendage to leaves, but not always present, any more than the footstalk, is the *Stipula*. See FULCRUM and STIPULA.

In the use of the various terms above explained, it is often found necessary to combine two of them; in order either to express some intermediate figure, or to provide for that variety or mutability of shape, very frequent in the foliage of many plants. Thus, *ovato-lanceolatum* indicates a lanceolate figure, somewhat dilated towards the base, so as to approach towards ovate; as *elliptico-lanceolatum* implies a dilatation about the middle. Or such compound terms may express, that the foliage, generally lanceolate, occasionally verges towards either of those broader forms. But we must be careful not to combine terms which are incompatible, as *conjugato-pinnata*, and *digitato-pinnata*, employed by some writers in defining *Mimosa*; whereas their meaning is *conjugata*, or *digitata*, in the first instance, and *pinnata* as regarding the secondary divisions. *Sub* is commodiously prefixed to many terms, when our application of them is doubtful, or not precise, as *subrotundum*, roundish, *subfessile*, nearly fissile; but it should be sparingly used. It too often indicates a want of decision or perspicuity in the writer, rather than any uncertainty in his subject. An acute observer can generally seize what is essential, in parts that are the least variable, in each particular tribe; passing over what is doubtful; and above all, not dwelling on too many particulars in his definitions, when a few are sufficient. The leaves of plants afford, on the whole, the most commodious specific distinctions, as being obvious, most generally present, and independent of the parts of fructification, from which the generic characters are taken. In few cases are the leaves of any genus so uniform or similar in all the species, as not to exhibit abundance of clear specific differences, especially when their stipulas and footstalks are taken likewise into consideration.

The Leaves of Plants have, in one instance only, as far as we know, been resorted to for the purpose of forming

a system of botanical arrangement. The celebrated Dr. Sauvages of Montpellier published, in 1751, a *Methodus Floriarum*, or an arrangement of the wild as well as garden plants about Montpellier, according to their foliage. It is preceded by an epistle to Linnæus in French, and an introduction in the same language. His orders are eleven: *Aphyllæ*, *Cespititiæ*, *Angustifoliæ*, *Latifoliæ*, *Adversifoliæ*, *Verrucillatæ*, *Digitatæ*, *Palmatæ*, *Pinnatæ*, *Decompositæ*, and *Laciniatæ*. But they offer, in many instances, too much violence to nature, and are attended with so little, if any, advantage, that it is not worth while to detail their characters. We doubt much whether this system was ever expected to be prevalent; but if so, the author, truly able and excellent in other departments of science, and even of systematic arrangement, has, in this case, been totally disappointed.

**LEAF**, in *Agriculture*, such parts of trees and shrubs as are annually shed and fall to the ground. Where the leaves of trees or plants can be collected in large quantities, as in parks and woodlands, they may be highly useful in augmenting the manure-heaps of the farmer. And it is advised by Mr. Young, in his *CaleNDAR*, that, in wooded counties, all the leaves that can be had at little expence should be raked up in October, and carted to the yards and standing folds, for littering and making them into dung: he does "it," he says, "at three-pence per one-horse cart-load. They do not rot easily, but that is," he thinks, "no objection to them; they are a sponge to be saturated with urine, and if not touched previously to carting on the land, will convey to the field much of what might otherwise be lost; and they are extremely useful in aiding the main object of bedding the yards" in the autumn and winter season; and of course save straw where that article is scarce.

**LEAF**, in *Gardening*. Leaves are of great use in the garden where they can be collected in proper supplies for mixing in hot-beds and other preparations, where gentle heat is required. They are, likewise, beneficial as light coverings against frost and severe seasons in many cases. See **LEAF**, in *Botany*.

**LEAF-cared**, in *Rural Economy*, a provincial term applied to horses when their ears are low and badly placed.

**LEAF**, *Indian*, in *Botany*. See **TAMALAPATRA**.

**LEAF**, *Water*. See **HYDROPHYLLUM**.

**LEAF** is also applied to the finest and most beautiful parts of flowers, more properly called *petals*.

It is true, all flowers have not leaves or petals; and it is sometimes difficult to determine which is to be called the leaves, and which the calyx of the same flower.

To prevent confounding the leaves of the flower with those of the rest of the plant, the former are called by botanists *petala*, the latter *folia*.

**LEAVES**, in *Architecture*, are an ornament of the Corinthian capital, and thence borrowed into the Composite; consisting in the representation of a double row of leaves covering the vase, tympanum, or neck of the column.

These leaves are usually formed in imitation of those of the acanthus; sometimes of those of olive, and sometimes of laurel.

The leaves are divided; each making three ranges of lesser, and are bent at top one-third of their height.

**LEAF-gold**. See **GOLD-leaf**.

**LEAVES**, in clocks and watches, are used for the notches of their pinions.

**LEAF-silver**. See **SILVER**.

**LEAGUE**, an extent of ground, considered lengthwise; serving to measure the distances of one place from another; and containing more or less geometrical paces, according to the different usages and customs of countries.

The word comes from *leuca*, or *leuga*, an ancient Gaulish word, for an itinerary measure, and adopted in that sense by the Romans. Some derive the word *leuca* from *λευκο*, *white*; because the Gauls, in imitation of the Romans, marked the spaces and distances of their roads with white stones. The Gallic *leuca* was =  $1\frac{1}{2}$  Roman mile = 2415,522 yards.

A sea-league is usually reckoned 3000 geometrical paces, or three English miles; the large leagues of France are usually 3000, and in some places 3500 paces; the mean or common league is 2500 paces, and the little league 2000. Chorier observes, that the ancient Gaulish leagues were but 1500 paces; and the modern French league is = 2500 toises = 5328,75 English yards. The term *lieue*, or league, is applied in different parts of France to very different distances. The astronomical league of 25 to a degree measures 4865 English yards. The legal *lieues*, of two French miles, by which the highways were measured, contain each 4265 English yards. The marine league of 20 to a degree measures 6081 English yards.

The Spanish leagues are larger than the French, 17 Spanish leagues making a degree, or 20 French leagues, or 69 $\frac{1}{2}$  English statute miles. The league of Spain is = four ancient Roman miles = 6441,392 yards. The large league of Spain is = five ancient Roman miles = 8051,74 English yards. On roads made since 1766, the distances are laid down at the rate of 8000 varas to the league; that is, 7416 English yards; so that five such leagues = 21 English miles nearly. But the juridical league is 5000 varas, or 4635 English yards; so that eight of these are equal to 21 English miles. Marine leagues are reckoned at the rate of 20 to a degree. But in different parts of Spain, the leagues are very different. The leagues of Germany and Holland contain four geographical miles each. The German league, or that of Scandinavia, is = 9662,886 English yards. The mile or league of Germany is = 200 Rhenish yards = 8239,846 English yards.

The Persian leagues are nearly the same with the Spanish; that is, each is equivalent to four Italian miles; which come nearly to what Herodotus mentions of the parafanga, an ancient measure among the Persians, containing thirty *stadia*; eight of which, according to Strabo, make a mile.

The Persians mark their leagues by trees, as the ancient Romans did by stones, *lapides*; for which reason they are also called *zagas*, a Turkish word signifying a tree. In Japan, the league consists of 1800 fathoms. These are all distinguished by little hillocks, raised on purpose by the road-side. See the leagues of most countries reduced to the Roman foot, under **MILE**. See also **MEASURE**.

**LEAGUE** also denotes an alliance or a confederacy between princes and states for their mutual aid, either in attacking some common enemy, or in defending themselves. The word comes from *liga*; which, in the corrupt Latin, was used for a confederacy: "Qua quis cum alio ligatur."

There have been several holy leagues entered into by the Christians, against the Saracens and Infidels; called also *crusados*, or *crusades*.

The League, by way of eminence, denotes that famous one on foot in France, from the year 1576 to 1593. Its intent was to prevent the succession of Henry IV. who was of the Reformed religion, to the crown; and it ended with his abjuration of that faith.

The leaguers, or confederates, were of three kinds: the *zealous* leaguers aimed at the utter destruction, not only of the Huguenots, but also of the ministry. The *Spanish* leaguers

leaguers had principally in view the transferring of the crown of France to the king of Spain, or the infantia his daughter. The moderate leaguers aimed only at the extirpation of Calvinism, without any alteration of the government.

LEAGUE, in *Geography*. See GRISONS.

LEAGUE of *God's House*. See *God's House*.

LEAGUE, *Grey*. See GREY LEAGUE.

LEAGUE of the *Ten Jurisdictions*, one of the three leagues into which the Grisons are distributed. This league ought properly to be called, and is not infrequently denominated in Switzerland, the league of the *eleven jurisdictions*, from the number of communities that compose it; but as on its first union it was formed of *ten* only, the original appellation is still retained, although one of the jurisdictions has been since that period divided into two. This territory was formerly under the dominion of the Vats, whose authority was limited, as the people possessed very considerable privileges. On the death of Donatus, the last baron, the count of Toggenburg, who married his eldest daughter, succeeded to his possessions; and Frederic, one of his descendants, dying in 1436, without issue, the communities united, formed an offensive and defensive alliance, and erected themselves into a league. After some vicissitudes, the communities became free, and their independence was solemnly ratified by the emperor Ferdinand III., soon after the peace of Westphalia. For further particulars, see GRISONS.

LEAGUE, *Solemn*. See COVENANT

LEAK, in *Sea Language*, is a chink or breach in the decks, sides, or bottom of a ship, through which the water comes in. A ship is said to *spring a leak* when she begins to leak, or let in the water.

The manner of stopping a leak is, to put into it a plug wrapt in oakum, and well tarred, or in a tarpauling cloth, which keeps the water out; or nailing a piece of sheet-lead on the place. See CAULKING, and FOTHERING.

Seamen sometimes stop a leak by thrusting a piece of salt beef into it. The sea-water, says Mr. Boyle, being fresher than the brine imbibed by the beef, penetrates into its body, and causes it to swell so as to bear strongly against the edges of the broken plank, and thereby stops the influx of the water. Works Abr. vol. i. p. 147.

A ready way to find a leak in a ship, is to apply the narrow end of a speaking trumpet to the ear, and the other to the side of the ship where the leak is supposed to be; then the noise of the water issuing in at the leak will be heard distinctly, whereby it may be discovered. See Philos. Trans. No. 201.

LEAKAGE, the state of a vessel that leaks; that is, lets water, or other liquid, ooze in or out.

LEAKAGE also denotes an allowance of three barrels in thirty-six, both of strong beer or table beer and ale, and after that rate for any greater or less quantity, out of the excise, 43 Geo III. c. 69. s. 12. The said allowance to the common brewer of three upon every thirty-six barrels of beer or ale, shall be in full compensation for all waste or other losses whatsoever. s. 13.

LEAKE, JOHN, M. D., in *Biography*, was born of Scottish parents in Cumberland, and received his education at the grammar-school at Bishop-Auckland. This being finished, he set off for London, intending to engage in the military profession: but finding some promises, with which he had been flattered, were not likely soon to be realized, he turned his attention to medicine. After attending the hospitals, and being admitted a member of the corporation of surgeons, an opportunity presented itself of improving himself in foreign schools; he embarked for Lisbon, and afterwards visited Italy. On his return, he established himself as

a surgeon and accoucheur in the neighbourhood of Piccadilly; and about that time published "A Dissertation on the Properties and Efficacy of the Lisbon Diet-drink." Where he obtained his doctor's diploma is not known; but he became ere long a licentiate of the College of Physicians, and removed to Craven-street, where he began to lecture, as well as continued to practise, the oblietric art. In 1765, he purchased a piece of ground on a building lease, and afterwards published the plan for the institution of the Westminster Lying-in-Hospital; and as soon as the building was raised, he voluntarily, and without any consideration, assigned over to the governors all his right on the premises, in favour of the hospital. He enjoyed a considerable share of reputation and practice as an accoucheur, and as a lecturer; and was esteemed a polite and accomplished man. He added nothing, however, in the way of improvement, to his profession, and his writings are not characterized by any extraordinary acuteness, or depth of research; but are plain, correct, and practical. He was attacked, in the summer of 1792, with a disorder of the chest, with which he had been previously affected, and was found dead in his bed on the eighth of August of that year. He published, in 1773, a volume of "Practical Observations on Child-bed Fever;" and, in 1774, "A Lecture introductory to the Theory and Practice of Midwifery, including the History, Nature, and Tendency of that Science, &c." This was afterwards considerably altered and enlarged, and published in two volumes, under the title of "Medical Instructions towards the Prevention and Cure of various Diseases incident to Women, &c." The work passed through seven or eight editions, and was translated into the French and German languages. In the beginning of 1793, a short time before his death, he published "A practical Essay on the Diseases of the Viscera, particularly those of the Stomach and Bowels." Hutchinison Biog. Med.

LEAKE, RICHARD, was born at Harwich in the year 1629, and was bred to the sea-service. At the restoration he was made master-gunner of the Princess, a frigate of fifty guns; and in the first Dutch war distinguished himself by his skill and bravery in two very extraordinary actions, in one against fifteen sail of Dutch men of war, and another in 1667, against two Danish ships in the Baltic, in which, the principal officers being killed, the command devolved on him, though only master-gunner. In 1669, he was promoted to be gunner of the Royal Prince, a first rate man of war. In 1673, he was engaged, with his two sons Henry and John, in the battle against Van Tromp, when the ship had all her masts shot away, nearly four hundred men killed and disabled, and most of her upper tier of guns dismantled. As she lay like a wreck, a Dutch man of war and two fire-ships came down upon her, and captain Rooke, afterwards Sir George, conceiving it impossible to defend her, desired the men to save their lives, and strike the colours. Mr. Leake hearing this, ordered the lieutenant off the quarter-deck, and took the command, saying "the Royal Prince shall never be given up to the enemy, while I am alive to defend her." The undaunted spirit of the brave gunner inspired the small residue of the ship's company with resolution, they returned to the fight, and, under the direction of this valiant gunner and his two sons, sunk both the fire-ships, and obliged the man of war to sheer off, and having thus saved the Royal Prince, he brought her into Chatham. Mr. Leake's joy in obtaining this victory was miserably damped by the loss of his eldest son Henry, who was killed by his side. Mr. Leake, in consequence of his great merit, was made, in 1677, master-gunner of England, and store-keeper of the ordnance at Woolwich. He invented, among other things, the cushee;

piece) and contrived a new method of firing a mortar. He died in 1686. He had a surprising genius for all inventions relating to gunnery, and also in the composition of fireworks. He left a son.

LEAKE, JOHN, who was but sixteen years of age when he was engaged in the battle just referred to, and in which he took a conspicuous part. He was shortly after made captain, and performed many prodigies of valour, and, among others, he executed a desperate attempt of conveying some victuallers into Londonderry, which obliged the enemy to raise the siege; he was also at the battle of La Hogue. In 1702, being commodore of a squadron, he destroyed the French trade and settlements at Newfoundland, and restored the English to the possession of the whole island. On his return he was made rear-admiral, and, in a short time afterwards, he was created vice admiral of the blue, and received the honour of knighthood. In 1705, he saved the important fortrefs of Gibraltar from the combined attacks of France and Spain, and was engaged in the reduction of Barcelona. In the course of the following year he relieved that same city, when it was reduced to the last extremity, and obliged king Philip to raise the siege. Soon after this he took the cities of Carthagená, Alicante, and Joyce, and concluded the exploits of the year with the reduction of the city and island of Majorca. On his return home, he was presented by prince George of Denmark with a valuable diamond ring, worth 400*l.*, and from the queen he received 1000*l.* as a reward of his important services. On the death of admiral sir Cloudesly Shovel, in 1707, he was made admiral of the white, and commander-in-chief of her majesty's fleet. In the following year he surprized a convoy of the enemies corn, sent it to Barcelona, and thus saved the city and the confederate army from the danger of famine. He reduced the island of Sardinia to obedience to Charles king of Spain, and assisted lord Stanhope in the conquest of Minorca. Returning home, he was appointed one of the council to the lord high admiral, and in 1709 he was made rear admiral of Great Britain. He was several times chosen member of parliament for Rochester, and in 1712 conducted the forces to take possession of Dunkirk. On the accession of George I. he was superseded, and allowed a pension of 600*l.*, upon which he lived in a private manner till his death, which happened at his house in Greenwich, in 1720. He left no children, but was succeeded in his property by

LEAKE, STEPHEN MARTIN, who was son of captain Martin, the brother-in-law of admiral Leake. Inheriting the property of the admiral, he took his name in addition to that of his own. He went through the different ranks in the Herald's office, till he came to be Garter. He was the first person who wrote professedly on English coins. He published a history of British coins, under the title of "Nummi Britannici Historia:" he wrote also "The Life of Sir John Leake," of which only 50 copies were printed: and in 1766 he printed 50 copies of "The Statutes of the Order of the Garter." He died in 1773.

LEAM, a term sometimes used for a cut or canal.

LEAM, in *Geography*, a high mountain of the county of Galway, Ireland, situated on the south side of Lough Corrib, near the small town of Oughterard.

LEAM-KIEN-SAM, a town of Chinese Tartary; 42 miles S. of Poro.

LEAM-YOM-HOTUN, a town of Corea; 600 miles E.N.E. of Peking. N. lat. 42 20'. E. long. 128° 46'.

LEANDER, in *Biography*, a French Capuchin friar, was born at Dijon, where he died, in the year 1667. His writings are numerous, and by these he acquired a high reputation:

he is frequently referred to by Dupin, in his "Nova Bibliotheca Auctorum Ecclesiasticorum." One of his works is entitled "The Truths of the Gospel;" in two volumes folio. Moreri.

LEAO, in *Geography*, a river of China, which runs into the sea; 12 miles W. of Lai-tcheou

LEAO, or *Lebo*, a river of Chinese Tartary, formed by the union of several rivers, of which no one bears this name till after it has passed the barrier between Leao-tong and Tartary. It runs into the gulf of Leao-tong, about 12 miles W. of Yaot-tleou.

LEAO, in *Natural History*, a mineral substance, approaching to the nature of the lapis lazuli, found in the East Indies, and of great use in the Chinese porcelain manufacture, being the finest blue they are possessed of. This stone is found in the strata of pit-coal, or in those of a yellowish or reddish earth, in the neighbourhood of the veins of coal. There are often found pieces of it lying on the surface of the ground, and these are a sure indication, that more will be found on digging. It is generally found in oblong pieces of the size of a finger, not round, but flat. Some of this is very fine, and some coarse, and of a bad colour. The latter is very common, but the fine sort is scarce, and greatly valued. It is not easy to distinguish them at sight, but they are found by experiment, and the trying one piece is generally sufficient for judging of the whole mine; for all that is found in the same place is usually of the same sort.

Their manner of preparing it for use is this: They first wash it very clean, to separate it from the earth, or any other foulness it may have; they then lay it at the bottom of their baking furnaces; and when it has been thus calcined for three or four hours, it is taken out and powdered very fine in large mortars of porcelain, with pestles of stone faced with iron. When the powder is perfectly fine, they pour in some boiling water, and grind that with the rest; and when it is thoroughly incorporated, they add more, and finally pour it off, after some time settling. The remainder at the bottom of the mortar, which is the coarser part, they grind again with more water, and so on, till they have made the whole fine, excepting a little dirt or grit. When this is done, all the liquors are mixed together, and well stirred. They are suffered to stand two or three minutes after this, and then poured off, with the powder remaining in them. This is sufficed to suffice gradually, and is the fine blue they use in their best works, our common small serving for the blue of all the common low-priced China-ware. Observat. sur les Coutumes de l'Asie, p. 326.

It is plain that this stone is a sort of lapis lazuli; and the ultramarine blue, used by our painters, is made in a manner not wholly unlike this. It is much to be wished, that England were well searched for such a stone as this leao, since our mines in Derbyshire afford many blue substances, which have not been sufficiently considered; and if it should be found that either this, or any other European nation, produces it, it will be a fine discovery, as we should not only have the means of giving a fine colour to our own manufactures of this kind, but we might trade with it in China to a vast advantage. If England does not possess it, it is very probable that Germany does, the mines there affording an almost inexhaustible store of coloured stones; and this being certainly no other than the stony matter of some crystalline nodules, accidentally tinged with some particles of copper. See LAZULI Lapis.

LEAO-TONG, in *Geography*, a province of Chinese Tartary, more usually called Chen-yang, or Mougden. (See CHEN-YANG.) The province is extremely fertile; but it is too far distant from Peking, and from the centre of

the empire, to send its provisions thither. Beside, carriage is altogether impracticable, except in winter; in this season, great quantities of game, and fish preserved, or inclosed in ice, according to the Chinese expression, are carried from that country to the capital.

LEAO-TONG, *Gulf of*, or *Yellow Sea*, is a large bay or gulf of the Chinese sea, between the peninsula of Corea and China; about 400 miles from N. to S., and from 100 to 250 from E. to W. N. lat.  $34^{\circ} 45'$  to  $41^{\circ}$ .

LEAO-COU-HOTUN, a town of Corea, on the S. side of the Ya-lou river; 370 miles E. of Peking. N. lat.  $40^{\circ} 9'$ . E. long.  $125^{\circ} 4'$ .

LEAP, in *Agriculture*, a measure of capacity, signifying half a bushel, sometimes termed *lip*.

LEAP, in *Music*, is when the song does not proceed by conjoint degrees. For instance, when there is an interval of a third, fourth, fifth, &c. between two notes, the Italians call it a *leap, salto*.

It is to be observed, that there are two kinds of leaps, regular and irregular, called by the Italians *salii regolari* & *irregolari*.

The *regular* leaps are those of a third major or minor, whether natural or accidental, fourth, fifth, sixth minor, and octave, and these either ascending or descending.

*Irregular* leaps are the triton, sixth major, seventh major, the ninth, tenth, and, in general, all beyond the compass of an octave, at least in vocal music.

Besides these, there are others which may be used, but with discretion; such as the diminished fourth, the false fifth, and flat seventh. The difference between the *regular* and *irregular* leaps is, that the former are performed by the voice, without any great difficulty or effort; whereas, the latter require more attention and pains to execute.

LEAP, in *Fishing*, is used for a net, engine, or wheel, made of twigs, to catch fish in. Stat. 4 & 5 Will. & Mary. cap. 23.

LEAP, in the *Manege*, an air of a step and a leap.

LEAPING-HORSE, in the *Manege*, is one that works in the high manege, or one that makes his leaps with order and obedience between two pillars upon a straight line, in volts, caprioles, balorades, or croupades. Use excludes a gallop *a terra a terra*, and converts from the number of leaps; because the horse does not rise so very high in these. Each leap of the horse ought not to gain, or make above a foot and a half of ground forward.

LEAP-YEAR, the same with *Bissextile*; which see.

It is thus called, because, in the common year any fixed day of the month changes successively one day of the week; but in the leap-year, it skips or leaps over one day.

The common year hath three hundred and sixty-five days in it, but the leap-year three hundred and sixty-six days; and in this case February hath twenty-nine days; which, in the common year, hath but twenty-eight.

To find the leap-year, the rule is,

“Divide by 4, what’s left shall be,

For leap-year, 0: for pass, 1, 2, or 3.”

For example; is the year 1812 a leap-year, or common-year.

4)1812(453

There is 0 remainder, so that it is leap-year.

LEASBURG, in *Geography*, a town of America, being the capital of Caswell county, in North Carolina; containing a court-house, gaol, and a few houses.

LEASE, from the French *laiser, dimittere, to let*, in *Law*, a demise, or letting of lands, tenements, or hereditaments, unto another for life, term of years, or at will, for a rent reserved.

A contract for the possession of lands or tenements, for some determinate period, is an *estate for years* (see *ESTATE*); and it takes place where a man letteth them to another for the time of a certain number of years, agreed upon between the lessor, or person who granteth a lease, and the lessee, the person to whom it is granted, and the lessee enters thereon. (Litt. § 58.) If the lease be but for half a year, or a quarter, or any less time, this lessee is reputed as a tenant for years, and is so styled in some legal proceedings; a year being the shortest term which the law takes notice of in this case. A year is a determinate and well-known period, consisting commonly of 365 days. (See *BISSEXTILE*.) A month, (see *MONTH*) in law, is a lease month, or 28 days, unless otherwise expressed; and, therefore, a lease for “twelve months” is only for 48 weeks; but if it be for “a twelve-month” in the singular number, it is good for the whole year. (6 Rep. 61.) These estates for years were originally granted to mere farmers or husbandmen, who every year rendered some equivalent in money, provisions, or other rent, to the lessors or landlords; but, in order to encourage them to manure and cultivate the ground, they had a permanent interest granted them, not determinate at the will of the lord. Their possession, however, was deemed of so little consequence, that they were rather considered as the bailiffs or servants of the lord, who were to receive and account for the profits at a settled price, than as having any property of their own; and, therefore, they were not allowed to have a freehold estate; but their interest existed after their deaths in their executors, who were to make up the accounts of their testator with the lord, and his other creditors, and were entitled to the stock upon the farm. The lessee’s estate might also, by the ancient law, be at any time defeated by a common recovery suffered by the tenant of the freehold (Co. Litt. 46.); which annihilated all leases for years then subsisting, unless afterwards renewed by the recoverer, whose title was supposed superior to his by whom those leases were granted. Estates for years, whilst they continued precarious, were usually of short duration, like our leases upon rack-rent; and we are told (Mirror. c. 2. § 27. Co. Litt. 45, 46.), that by the ancient law no leases for more than 40 years were allowable, because any longer possession (especially when given without any livery declaring the nature and duration of the estate), might tend to defeat the inheritance. This law, if it did ever exist, was soon antiquated; for, in Madox’s “Collection of Ancient Instruments,” some leases for years, of a pretty early date, occur, which considerably exceed that period; and long terms, for 300 or 1000 years, were in use in the time of Edward III., and probably of Edward I. But when, by the statute 21 Hen. VIII. c. 15. the tennor (that is, he who is entitled to the term of years), was protected against these fictitious recoveries, and his interest rendered secure and permanent, long terms began to be more frequent than before; and were afterwards extensively introduced, being found extremely convenient for family settlements and mortgages; continuing subject, however, to the same rules of succession, and with the same inferiority to freeholds, as when they were little better than tenancies at the will of the landlord.

Every estate which must expire at a period certain and prefixed, by whatever words created, is an *estate for years*; and, therefore, this estate is frequently called a term, *terminus*, because its duration is limited and determined; for every such estate must have a certain beginning and certain end. (Co. Litt. 45.) But “id certum est, quod certum reddi potest;” therefore, if a man make a lease to another, for

for many years as J. S. shall name, it is a good lease for years (6 Rep. 35.); for though it is at present uncertain, yet when J. S. hath named the years, it is then reduced to a certainty. If no day of commencement is named in the creation of this estate, it begins from the making, or delivery, of the lease. (Co. Litt. 46.) A lease for so many years as J. S. shall live, is void from the beginning (Co. Litt. 45.); but a lease for 20 or more years, if J. S. shall so long live, is good, for a certain period is fixed, beyond which it cannot last, though it may determine sooner, on the death of J. S. An estate for life, even if it be *pur autre vie*, is a freehold; but an estate for 1000 years is only a chattel, and reckoned part of the personal estate. A lease for years may be made to commence *in futuro*, though a lease for life cannot. Because no livery of seisin is necessary to a lease for years, such lease is not said to be *seized*, or to have true legal seisin of the lands. Nor, indeed, does the bare lease velt any estate in the lessee; but only gives him a right of entry on the tenement, which right is called his "interest in the term," or *interesse termini*; but when he has actually so entered, and thereby accepted the grant, the estate is then, and not before, vested in him, and he is *possessed*, not properly of the land, but of the term of years (Co. Litt. 46.); the possession, or seisin of the *land* remaining still in him who hath the freehold. Thus, the word "term" does not merely signify the time specified in the lease, but the estate also and interest that passes by that lease; and, therefore, the "term" may expire during the continuance of the "time," as by surrender, forfeiture, or the like. See TENANT.

*Estates at will*, another species of estates not freehold, are those where lands and tenements are let by one man to another, to have and to hold at the will of the lessor; and the tenant by force of this lease obtains possession (Litt. § 68.) Such tenant hath no certain indefeasible estate, nothing that can be assigned by him to any other; because the lessor may determine his will, and put him out whenever he pleases. But every estate at will is at the will of both parties, landlord and tenant; so that either of them may determine his will, and quit his connection with the other at his own pleasure. If, indeed, the tenant at will sows his land, and the landlord, before the corn is ripe, or before it is reaped, puts him out, yet the tenant shall have the emblements, and free ingress, egress, and regress, to cut and carry away the profits. (Co. Litt. 56.) But it is otherwise, where the tenant himself determines the will; for in this case the landlord shall have the profits of the land. (Co. Litt. 55.) And if rent be payable quarterly, or half-yearly, and the lessee determines the will, the rent shall be paid to the end of the current quarter or half-year. (Salk. 414. 1 Sid. 339.) Upon the same principle, courts of law have of late years leaned as much as possible against construing demises, where no certain term is mentioned, to be tenancies at will; but have rather held them to be tenancies from year to year so long as both parties please, especially where an annual rent is reserved, in which case they will not suffer either party to determine the tenancy even at the end of the year, without reasonable notice to the other, which is generally understood to be six months. For another species of estates at will, see COPYHOLD. See also SUFFERANCE.

A lease is either written, called an *indenture deed-poll*, or lease in writing; or by word of mouth, called *lease-pareol*. See PAROL.

All estates, interests of freehold, or terms for years in lands, &c. not put in writing and signed by the parties, shall have no greater effect than as estates at will; unless it be of leases not exceeding three years from the making; wherein the rent reserved shall be two-thirds of the value

of the things demised. (Stat. 29 Car. II. cap. 3.) Leases exceeding three years must be made in writing, and if the substance of a lease be put in writing, and signed by the parties, though it be not sealed, it shall have the effect of a lease for years, &c. Wood's Int. 266.

But a lease in writing, though not under seal, cannot be given in evidence, unless it be stamped. (1 Term. Rep. 735.) Articles with covenants to make a lease to let and make a lease of lands, for a certain term, at so much rent, hath been adjudged a lease. (Cro. Eliz. 486.) In a covenant, with the words "have, possess, and occupy lands, in consideration of a yearly rent, without the word demise," it was held a good lease; and a licence to occupy, to take the profits, &c. which passeth an interest, amounts to a lease. (3 Bull. 204. 3 Salk. 223.) An agreement of the parties, that the lessee shall enjoy the lands, will make a lease; but if the agreement hath a reference to the lease to be made, and implies an intent not to be perfected till then, it is not a perfect lease till made afterwards. (Bridg. 13. 2 Shep. Abr. 374.) If a man, on promise of a lease to be made to him, lays out money on the premises, he shall oblige the lessor afterwards to make the lease; the agreement being executed on the lessee's part, where no such expence hath been, a bare promise of the lease for a term of years, though the lessee have possession, shall not be good without some writing. A lease for years may begin from a day past, or to come, at Michaelmas last, Christmas next, three or four years after, or after the death of the lessee, &c. though a term cannot commence upon a contingency which depends upon another contingency. (1 Inst. 5. 1 Rep. 156.) If one makes a lease for a year, and so from year to year, it is a lease for two years; and afterwards it is but an estate at will. (1 Mod. 4. 1 Lutw. 213.) And if from three years to three years, it is a good lease for six years; also, if a man make a lease for years, without specifying the number, it may be good for two years, to answer the plural number. (Wood's Int. 265.) Of all kinds of powers the most frequent is that to make leases. In the making of such leases all the requisites specified in the power must be strictly observed; and such leases must contain all such beneficial clauses and reservations as ought to be, for the benefit of the remainder-man; the principle being, that the estate must come to him in as beneficial a manner as the ancient owners held it. By stat. 29 Geo. II. c. 31. infants, lunatics, and femes-covert, may apply to the courts of chancery or exchequer, or to the courts of equity of the counties palatine of Cheiler, Lancaster, and Durham, or to the courts of great session of Wales, by petition or motion in a summary way, and by the order of these courts respectively, such persons may by deed only, without levying a fine, surrender leases for lives or years, and take new leases for lives or years of the premises comprised therein. Joint-tenants, tenants in common, and coparceners may make leases for life, years, or at will, of their own parts, which shall bind their companions; and in some cases, persons who are not seized of lands in fee, &c. may make leases for life or years, by special power enabling them to do it; when the authority must be exactly pursued. (Wood's Int. 267.) But there is a difference, where there is a general power to make leases, and a particular power. (8 Rep. 69.) If joint-tenants join in a lease, this shall be but one lease, for they have but one freehold; but if tenants in common join in a lease, it shall be several leases of their several interests. 3 Rol. Abr. 641. Com. Dig. title *Estates* (C. 6.) Bac. Abr. Leases (l. 5.) A lessee may take covenants on the tenement let for the rent; or may have action of debt for the arrears, &c. Tenants suffering houses to be uncovered, or in decay, taking away

waincot, &c. fixed to the freehold, unlets put up by the lessee, and taken down before the term is expired; cutting down timber trees to fell, permitting young trees to be destroyed by cattle, &c. ploughing up ground that time out of mind hath not been ploughed, not keeping banks in repair, &c. are guilty of wastes. (1 Inst. 52. Dyer 37. 2 Salk. 368.) Lessees are bound to repair their tenements, except the contrary be mentioned in the lease. Although a lessee for years is not obliged to repair the house let to him, which is burned by accident; if there be not a special covenant in the lease, that he shall leave the house in good repair at the end of the term; yet if the house be burnt by negligence, the lessee shall repair it, although there be no such covenant. (Pasch. 24 Car. B. R.) A lessee at will is not bound to sustain or repair, as tenant for years is. A lessee who covenants to pay rent, and to repair, with an exception of casualties by fire, is liable upon the covenant for rent, though the premises are burnt down, and not rebuilt by the lessor after notice. (1 Term Rep. 310.) A proviso in a lease for two years, that the landlord shall re-enter, on the tenant's committing any act of bankruptcy, on which a commission shall issue, is good. (2 Term Rep. 133.) An assignee of a bankrupt, a devisee, and a personal representative, are assignees in law to the purpose of being liable to actions on a covenant for rent in a lease to the bankrupt, devisee, or intestate. (Doug. 184.) Persons for whose lives estates are held by lease, &c. remaining beyond ten, or being absent seven years, if no proof be made of their being alive, shall be accounted dead. (See 19 Car. II. c. 6.) Where the term of a lease is to end on a precise day, then, there is no occasion for a notice to quit; because the lease of course is at an end, unless the parties come to a fresh agreement. In the case of a tenancy from year to year, there must be half a year's notice to quit, ending at the expiration of the year. Six calendar months' notice is not sufficient. And there is no distinction between houses and lands as to the time of giving notice to quit. 1 Term Rep. 54. 159. 162, 3. Blackf. Com. b. ii. Tomlins's Jacob, tit. Lease.

**LEASE BY STATUTE.** There are three kinds of persons, who may make leases for three lives or twenty-one years, and not exceeding this term, by statutes, that could not do so heretofore, *viz.* tenants in tail, binding their issue in tail, but not in remainder or reversion; husband and wife, of the wife's land; and persons seized of an estate in fee simple in right of the church, except parsons and vicars; by the stat. 32 Hen. VIII. c. 28. called the "enabling statute."

But this statute specifies several requisites in order to render the leases binding: they must be by indenture, and not by deed-poll, or parol. They must commence from the day of making, and not at any greater distance of time: the old lease, if there be any, must be first absolutely surrendered, or be within a year of expiring; it must be either for twenty-one years, or three lives, and not for both; it must not exceed the term of three lives, or twenty-one years, but may be for a shorter time: the lease must be of corporeal hereditaments, and not of such things as lie merely in grant; for no rent can be reserved out of these by the common law, as the lessor cannot resort to them to distrain; though now by 5 Geo. III. c. 17. a lease of tithes or other incorporeal hereditaments alone, may be granted by any bishop or ecclesiastical or eleemosynary corporation, and the successor shall be entitled to recover the rent by an action of debt, which, in case of a freehold lease, he could not have brought at the common law. The lease must also be of lands and tenements commonly letten for twenty years past; and the customary rent for that term reserved; and leases must not be made without impeachment of waste.

By 1 Eliz. c. 19. called the "disabling or restraining statute," it is enacted, that all grants by archbishops and bishops, other than for the term of twenty-one years or three lives from the time of making, or without reserving the usual rent, shall be void: but this statute did not extend to grants made by any bishop to the crown; however, these, as well as those made to any subject, were comprehended in the prohibition of the statute 1 Jac. I. c. 3. The restrictions of this statute were extended by 13 Eliz. c. 10. explained and enforced by 14 Eliz. c. 11. and 14. 18 Eliz. c. 11. and 43 Eliz. c. 29. to certain other inferior corporations, both sole and aggregate. From all these it is collected, that all colleges, cathedrals, and other ecclesiastical or eleemosynary corporations, and all parsons and vicars, are restrained from making any leases of any kind, of their land, unless under the following regulations: 1. They must not exceed twenty-one years or three lives from the making. 2. The accustomed rent, or more, must be yearly reserved upon them. 3. Houses in corporations or market-towns may be let for forty years; provided they be not the mansion-houses of the lessors, nor have above ten acres of ground belonging to them, and provided the lessee be bound to keep them in repair; and they may also be aliened in fee-simple for lands of equal value in recompence. 4. Where there is an old lease in being, no concurrent lease shall be made, unless where the old one will expire within three years. 5. No lease by the equity of the statute shall be made without impeachment of waste. (Co. Litt. 45.) 6. All bonds and covenants tending to frustrate the provisions of the statutes 13 and 18 Eliz. shall be void. The 13 Eliz. c. 20. together with all explanations, &c. of the same by 14th, 18th and 43d of Eliz. and much of 3 Car. I. which made them perpetual, are repealed by 43 Geo. III. c. 84. f. 10.

If a bishop have two chapters, as they may be two or more to one bishopric, both chapters must confirm leases made by the bishop. (1 Inst. 131.) A lease made by a bishop to begin presently for twenty-one years, when there is an old lease in being, is good, notwithstanding the stat. of 1 Eliz. c. 19. (Moor. Caf. 241.) But if such a lease is to commence at a future day, it will be void. (1 Leon 44.) Lease for three lives by a bishop of tithes is void against the successor, although the usual rent be duly received. (Moor. Caf. 1078.) Leases of a dean and chapter are good, without confirmation of the bishop. (Dyer, 273. 2 Nelf. Abr. 1096.) Where there is a chapter and no dean, they may make grants, &c. and are within the statute. (1 Mod. 204.) A prebendary's lease confirmed by the archbishop, who is his patron, is good, without confirmation of dean and chapter. (3 Bullstr. 290.) But where a prebendary made a lease for years of part of his prebend, and this was confirmed by dean and chapter; because it was not confirmed likewise by the bishop, who was patron and ordinary of the prebend, the lease was adjudged void. (Dyer 65.) If a prebendary hath rectories in two several dioceses, belonging to his prebend, and his lease of them is confirmed by the bishop, dean and chapter of the diocese of which he is prebendary, it is good, though not confirmed by the other. (Litt. 75.) A chancellor of a cathedral church may make a lease, and it is said it will be good against the successor, though not confirmed, &c. (Litt. 158.) If a parson or vicar makes a lease for life or years, of lands usually letten, reserving the customary rent, &c. it must be confirmed by patron and ordinary, for they are out of the statute 32 Hen. VIII. c. 28. And if the parson and ordinary make a lease for years of the glebe to the patron; and afterwards the patron assigns the lease to another, such assignment is good, and is a confirma-  
tion

tion of that lease to the assignee. (5 Rep. 15.) A lease for years of a spiritual person will be void by his death, if it is not according to the statute; and a lease for life is voidable by entry, &c. of his successor. (2 Cro. 173.) If a bishop be not bishop *de jure*, leases made by him to charge the bishopric are void, though all judicial acts by him are good. (2 Cro. 353.) And where a bishop makes a lease, which may tend to the diminution of the revenues of the bishopric, &c. which should maintain the successor, there the deprivation or translation of the bishop is the same with his death. 1 Inst. 324.

There is another restriction with regard to college leases, by stat 18 Eliz. c. 6. which directs, that one-third of the old rent, then paid, should for the future be reserved in wheat or malt, reserving a quarter of wheat for each *Gr. 8d.* or a quarter of malt for every *5s.*; or that the lessees should pay for the same according to the price that wheat and malt should be sold for, in the market next adjoining to the respective colleges, on the market-day before the rent becomes due. This money arising from corn rents is, *communibus annis*, almost double to the rents reserved in money.

But when a quarter of wheat is worth *50s.* and the colleges receive one-third of their rent in corn, *i. e.* a quarter of wheat, or its value for every *13s. 4d.* which they are paid in money, it follows that the corn rent will be in proportion to the money rent nearly as four to one. But these rents united are very far from the present value. Colleges, therefore, in order to obtain the difference, generally take a fine upon the renewal of their leases.

The leases of beneficed clergymen are farther restrained, in case of their non-residence, by statutes 13 Eliz. c. 20. 14 Eliz. c. 11. 18 Eliz. c. 11. 43 Eliz. c. 9. which direct, that if any beneficed clergyman be absent from his cure above fourscore days in any one year, he shall not only forfeit one year's profit of his benefice to be distributed among the poor of the parish; but that all leases made by him of the profits of such benefice, and all covenants and agreements of like nature, shall cease and be void; except in the case of licensed pluralists, who are allowed to demise the living, on which they are non-resident, to their curates only, provided such curates do not absent themselves above forty days in any one year. Blackt. Con. b. ii.

An *assignment* differs from a lease only in this; that by a lease one grants an interest less than his own, reserving to himself a reversion; in assignments he parts with the whole property, and the assignee stands to all intents and purposes in the place of the assignor.

If a lessor accepts of rent from an assignee, knowing of the assignment, it bars him from action of debt against the lessee; for the privity of contract is extinguished: but after such acceptance, the lessor or his assigns may maintain an action against the first lessee upon his covenant for payment of the rent. (1 Saund. 241. 3 Rep. 24.) But acceptance of rent from the assignee has been adjudged a sufficient notice of the assignment, so that the lessor could not resort to the first lessee. 2 Bulltr. 151.

**LEASES of the King.** Leases made by the king, of part of the duchy of Cornwall, are to be for three lives, or thirty-one years; and not to be made disposable of waste, whereon the ancient rent is to be reserved; and estates in reversion, with those in possession, are not to exceed three lives, &c. 13 Car. II. c. 4.

Leases from the crown of lands in England and Wales, and under the seals of the duchy of Lancaster, &c. for one, two, or three lives, or terms not exceeding fifty years, are

allowed time for inrollment, &c. by stat. 10 Ann. c. 18. Leases made by the prince of Wales of lands, &c. in the duchy of Cornwall, for three lives, or thirty-one years, on which is reserved the most usual rent paid for the greatest part of twenty years before, shall be good against the king, the prince, and their heirs, &c. and the conditions of such leases be as effectual as if the prince had been seized of an absolute estate in fee-simple in the lands. Stat. 10 Geo. II. c. 20.

**LEASE of Land, in the Economy of Agriculture,** a kind of contract or agreement for the letting of lands, tenements, &c. either for life, or a certain term of years, under a reserved rent. It has been stated by Mr. Marshall, that the different modes of holding land are first that of "the tenant holding at will, or until the customary notice be given, by either party to the other,—without any legal contract or written agreement,—the only tie between the owner and the occupier being the custom of the estate, or of the county in which it lies,—and the common law of the land." This, he conceives, may be considered as "the simple holding which succeeded the feudal or copyhold tenure; but which is now going fast into disuse." The second mode is that of "holding from year to year, under a written agreement, with specified covenants." This, which is a more modern usage, is, on the contrary, he thinks, becoming more and more prevalent; even where leases for a term of years were formerly granted." The third, is that of a "lease for a term of years; as seven, fourteen, twenty-one, or a greater number of years certain; but without the power of assignment, unless with the consent of the lessor." And the fourth, that of a "lease for lives; as one, two, three, or more, without the power of assignment, which he believes now are rarely granted in England, but in Wales they are still prevalent; the rent being there settled according to the value of the land at the time of letting, as on granting a lease for a term. And, in the western extremity of England, what are termed life leases are still common. But that they are in fact rather pledges for money taken up, or deeds of sale for lives, than leases; as nearly the whole of the estimated sale value of the land, during the life term, is paid down at the time of purchase, the seller reserving only a quit-rent or annual acknowledgment."

It is conceived by the same writer, that life leases may be considered in different points of view; as "to a tenant who holds at a moderate rent, a lease for life is gratifying, his farm becoming a sort of life estate, in which he is fixed for life; but that unless he is a prudent or a fortunate man, it may prove a source of misfortune to his family, who in the moment of their distress for his loss, may be liable to be turned out, penniless, from a house and home: a circumstance which can rarely happen, under holdings for certain terms of years." These sorts of leases have a much better effect, it is supposed, on agriculture than annual holdings; and that it is more than probable that life tenancy heretofore has assisted in the advancement of the art. "It is, however, a well ascertained fact, that the manifold and great improvements which have taken place in English agriculture, during the last half century, have not been effected in Devonshire nor in Wales, but in Norfolk, and in the midland counties under leases for terms of years." And "that in a political light, life leases have a favourable appearance, as tending to fill up a space between ordinary tenants and yeomanry or small proprietors, and giving their holders better stakes than less certain occupiers have, in the established order of things." But that "here it is the light in which life-holds appear to land proprietors that is entitled to the

chief attention," which "on whatever side they have been viewed by the owners of extensive estates during the last twenty or thirty years, have doubtlessly appeared in odious colours. For owing to the rapid depreciation of money there are proprietors who have been receiving, year after year, not more perhaps than one-half, or a less proportion, of the fair rental value of many of their lands. And for such as still hang on good lives, they may not receive more for many years to come." And further, that "owing to the perpetual bondage in which their lands are kept, no general work of arrangement can be effected, nor any individual improvement introduced by a proprietor, who can scarcely be said to have any authority either over his estate or its possessors." They have in fact been the bane of every useful improvement of the soil, and the great cause of its want of amelioration in every county where they have existed to any extent.

It may be noticed, that those sorts of holdings which are only for the year, "are, to a tenant, most discouraging; and to improvement in agriculture most unfriendly. In a public view they are of course highly impolitical: while to a proprietor they are most convenient, as he may be said to be in constant possession of his estate. He can lay out and execute general improvements, as embankments and drainage, extensive works of irrigation, the alteration of water-courses, roads and fences, and complete the arrangement of tenements without controul. It would be unwise, therefore, on an estate under this sort of tenancy, to alter it, until the requisite improvements were planned, and put in a train of being performed." It has, however, been further justly remarked, that "whatever discourages agriculture cannot be permanently profitable, either to a proprietor or the community." And in regard to present profit they must be highly disadvantageous to the proprietor or owner.

With respect to the third holding of land, as that of leases for terms of years, as "for twenty-one years, though they may be profitable at their commencement, they have, it is supposed, been found much otherwise before their expiration: owing to the great rise in the value of farm produce, during the terms. And while proprietors who were letting their lands from year to year, were profiting by this circumstance; the income of those whose lands were under long leases (whether of lives or years) were stationary; and this while the expences of living were advancing with the value of lands; which circumstances, added to their being controuled in the required arrangement, and perhaps annoyed during a length of years, by the improper conduct of ignorant, ill-disposed, purse-proud tenants (enriched by these very circumstances) have determined many persons in different parts of the kingdom to discontinue the practice of granting leases; giving written agreements from year to year only; which is much to be lamented for the interest of agriculture and the community in general." While others have shortened the terms of their leases to fourteen years. But such "has been the rapid depreciation in the value of money, and the nominal increase of the value of lands, that even this term has been found seriously inconvenient to a landlord; and the term of seven years (without a covenant of remuneration) is, it is believed, of little use to a tenant." These fixed leases are liable, it is conceived, to another objection. As "although a man of spirit and worth will not only give an advanced rent, in the first instance, but will, through the improvements he has made, be able and willing to give a still greater advance at the end of the term; yet, when a lease of this nature has been unfortunately or improvidently granted to a poor, an ignorant, an indolent, a resentful, or a dishonest man, the farm thus

let may be left at the end of the term in a much worse condition than it was in at the commencement." This renders it highly necessary for the manager of an estate to be careful in the choice of tenants. Where great and expensive improvements are required, it will be constantly necessary, however, to have long leases.

This may be remedied, in a great measure, by the renewal of leases before their terms are expired.

The above writer considers it useful, for owners or proprietors to come to clear understandings with their tenants, three years previously to the terminations of their respective leases. "For it is conceived, that, until about that period, a skilful tenant continues to keep his land in cultivation and condition, for his own interest; which, until then, may be said to go hand in hand with that of his landlord. And if, at that period of a lease, a fresh agreement were entered into, the ruinous consequences of an expiring term might be avoided." And that from proprietors objecting to give leases for long terms, "it occurred to him, that agreements for holding from three years to three years, instead of from year to year, would be an eligible species of tenancy. Or, which is precisely the same thing, granting leases for six years certain; with a condition, that if neither party give notice to quit before the expiration of the first three years, then the term to be prolonged to nine years; and so on, from three years to three years, (or in effect from six years to six years,) until three years after notice has been duly given by either party to the other," as by these means room is given for a tenant "to turn his hand in. He has, in reality, a fresh lease of six years granted him every third year. And this is sufficient to encourage him to keep his lands continually in the most husbandlike state. And if he execute any of the higher improvements, it is but reasonable that he should have, whenever he may quit his farm, an equitable remuneration for the remainder of such improvements. Thus the tenant is placed on sure ground; he may still manure and improve with much the same confidence, as if the lands in his occupation were his own property." And "in return for such advantages, the tenant cannot hesitate, it is supposed, to covenant, that, during the last three years of his term, he will manage his farm in a husbandlike manner, and at the end of the term leave it in such a state of cultivation and repair, as will induce a good tenant to take it at a full rent; or suffer the proprietor to put it in such a state, at his (the out-going tenant's) expence. An estate which is under lease on these principles, and under attentive management, cannot, it is conceived, be let down to an unprofitable state. It must continually remain under a regular course of husbandry, and in a state of cultivation and repair; and the more permanent improvements be kept up. If the acting manager do his duty, even the changing of tenants cannot interrupt its prosperity," while "the incoming tenant (under active management) steps into his farm, with the advantages that he would have enjoyed, had it been under his own direction, for the three preceding years." But "with a lease on this principle, and with a proper choice of tenants, removals can rarely happen. What proprietor, who knows the difficulty of procuring a good tenant, would wish to discharge him? And no such tenant would readily leave the farm he is settled upon, if he find proper treatment. Even should notice be given in consequence of any misunderstanding between the parties, three years allow time for reflection; and, before they expire, repentment may die away, and cordiality be restored. If, however, either party be dissatisfied, he has an easy way of dissolving the connection. Or if a proprietor is desirous to make fresh arrangements on his estate, or to regulate his rent-roll by the exit-

ing value of money, he need not wait many years to fulfil his desires; for if the tenant in occupancy will not agree to pay a fair rent, the owner has three years before him to choose one who will." It is thus evident, that "a lease on this principle has a decided preference, by a proprietor, to long leases. And its advantage over annual holdings is not less considerable. The lands of an estate are well worth from five to ten *per cent.* more to a tenant, under the former, than under the latter tenancy. So that beside the conveniences mentioned, a proprietor may be immediately adding very considerably to his income, by this principle of management." This has been proved in many cases in different parts of the kingdom.

*Covenants of Leases.*—It is suggested, that the necessary covenants,—the reservations, restrictions, obligations, penalties, and remunerations, that the lease (or form of a lease) of any landed estate contains, are (or ought to be) a code of private restraining laws, suited to the circumstances of that particular estate, in order to protect it from injury, and to promote its prosperity: an honest tenant considers the covenants of his lease merely as instructions to direct his steps, but which ought to restrain him no farther than to protect the farm or the estate from injury. But a worthless tenant, as a thief, is ever ready to break the laws which bind him; and the proprietor of an estate ought to have some means of punishing him for his fault. Penal covenants in leases are of course of the greatest importance to proprietors. But on account of "the great difficulty with which a general law of this nature would be framed, owing to the great diversity of soils, situations, and modes of culture, every estate, strictly speaking, requiring its own peculiar code to govern and defend it, (and of course the great difficulty which a court must find to decide with any sort of accuracy in cases of this kind,)—one would naturally imagine, it is said, that courts of law would rather be thankful to proprietors of estates, for furnishing them with ready and safe means of doing justice, than set their faces against any covenants, which have been formerly entered into, and legally confirmed by the parties before them. If penalties are excessive or oppressively severe, or have been surreptitiously imposed, it undoubtedly belongs to a court of law to mitigate or remove them. But severe restrictions, and excessive penalties, are highly impolitic, and altogether improper to be introduced into the lease or law of an estate, inasmuch as they tend to depress its character, and may prevent good tenants from settling upon it; or drive away those whom it may already possess; and of "course militating against one of the first principles of good management." But "where, by judicious restrictions and reasonable penalties, designing men are kept aloof, a general good is gained to the estate."

The particular covenants that are necessary, must be determined by the existing circumstances of the estate, or the particular farm for which it is intended; the modes of culture, cropping, &c. as it is obvious, that "a grass land farm requires a set of covenants differing from those which are proper for a farm under mixed cultivation. And an arable farm, situated near a great town, should have covenants differing in some respects from those of another, which lies in a replete district: while every part of an estate, and all estates on which hedge timber can be profitably raised, call for a series of regulations, which an untimbered estate, or one on which grown timber only is to be protected, does not require." And that, "much depends on the time of changing tenants. A spring and autumnal removal require very different stipulations respecting the states in which the lands of a farm are to be left; how the crops in the ground, and the produce on hand are to be disposed of; and by

whom the crops of the succeeding year are to be put in. Every district has its customary time or times of removal, and it can seldom be prudent in an individual to alter it (even though very improperly fixed) as he might thereby diminish his choice of tenants. Nevertheless, it is in the power of proprietors conjointly, to effect, in time, the required alteration. Michaelmas and Lady-day may be considered as the ordinary times of changing tenants in England. The former is not an ineligible time for removing in autumn, but the latter is extremely improper, as being in the middle of spring feed time, and falling at a time when the winter fodder is partially expended, and the crops of the preceding year are partially thrashed out." Mr. Marshall states, that "in the north of England (Cleveland, in Yorkshire, being the most northern district in which he has observed it,) a far more rational plan of removal is established. There, the arable lands are quitted at Candlemas; the pasture grounds (Cleveland being much of a dairy district) at Lady-day; and the mowing ground and the home-stall at old May-day." While, in Scotland, similar regulations prevail; but with a well judged difference, which naturally arises out of the different climates of the two situations. There, the premises are finally quitted at what is termed Whitsuntide, namely, the fifteenth of May old style." And it is the opinion of this writer, that, "for the more southern provinces of England, the first of May, new style, would be a proper time for removals in the spring."

*Forms of Leases.*—In respect to the forms of leases, those which are good do not, it is stated, "merely require a judicious selection of covenants, but that the several clauses should be properly digested; and be arranged, worded, and lettered in such a manner, as to be intelligible to plain countrymen,—to men for whose guidance and good government they are intended." And the plan, which experience entitles the above writer to recommend, is that "of printing leases on large folio sheets of firm paper, or sheets of parchment, folded in the folio manner; each page containing two columns, and each clause composing a distinct paragraph; with a blank page, or half page, to receive a sketch, or rough plan of the farm demised; as well as a particular, or schedule, of the different parcels of land of which it is composed: with the number, name, and measurement of each arranged in the column manner: in order that no doubt may at any time arise respecting their identity." It is useful to have a book in which all these, and some other circumstances, are regularly arranged and marked down.

Mr. Kent, in his "Hints to Gentlemen of Landed Property," states, that the ancient feudal tenures had undoubtedly a strong tendency to enslave mankind, by subjecting them to the controul and power of an arbitrary lord; but, like most other things, there were some advantages to be found in the system. Every man who held land had a certainty in it, as the tenant generally held his possession for life. When these tenures were discontinued by the more liberal spirit of modern law, some new compact became necessary, and terms of years were substituted in lieu of the former; for, as land properly managed requires great expence, and seldom answers that expence in one year, it was but reasonable that the man who applied his judgment, devoted his labour, and ventured his capital, should have some reasonable time allowed him to reimburse himself, and derive some proportionate reward for what he had done. In the course of time, this term began to be reduced into a certain number of years; and as moit of the land was formerly under the regulation of two crops and a fallow, the time allowed was from three to twenty-one years. And the latter in the end became the most general limitation,

and is the most prevalent term for leases at the present period.

There can be no doubt, it is supposed, but that leases are the first, the greatest, and most rational encouragement that can be given to agriculture; yet of late years there are very strong prejudices entertained against them.

Let any impartial man take a view of two districts, where it is the custom to grant leases, and where it is not: in the former he will generally find a respectable yeomanry, and a well cultivated country; in the other, an indigent spiritless race; following a contracted system of husbandry, calculated to answer no permanent purpose of advantage to themselves or landlords. Yet, there are many gentlemen who, to have such people at immediate command, prefer the continuance of a slovenly unproductive style of husbandry, to neatness and fertility. In some parts of England, the prejudice against leases is so strong, that some landlords will be tempted almost as soon to alienate the fee simple of their estates, as to grant a tenant a reasonable term in them. It is very unfortunate for a county where this abhorrence of leases prevails, as it keeps back an immense scene of improvement, which otherwise would take place, and robs the industrious occupier of a deal of comfort which might be bestowed upon him; and it can produce no other consolation to the owner than that of having the country more at command, and forcing a certain degree of respect from it, which is absurd to the last degree; for a landlord may, it is conceived, ensure as much real respect from a tenant on lease, as from a tenant at his immediate will and pleasure, and at the same time secure his property better, and stipulate for improvements to the extent of his inclination or desire.

It is noticed farther, that in the eastern counties, where it is more the custom to grant leases than in the midland parts of England, agriculture is upon the most respectable footing; and that within half a century there are many estates more than doubled in their value; which, without leases, where the means of improvement were heavy, could not have carried a third of the advance that has been put upon them. In short, it seems to him unreasonable to expect a man to employ the whole of his capital, and to devote the best part of his life upon an estate which, on the death or mere caprice of the landlord, he is liable to be turned out of at six months, or perhaps a shorter notice.

It is not, however, meant to imply, that leases ought not in any case to be withheld; there are certainly some exceptions against the practice he wishes to see established: for instance, if lands are situated very near a gentleman's house, part of which it may, perhaps, be an object, on some future occasion, to take into hand, or where a minor is very near coming of age, or where there is any immediate view of sale; in such cases, it would be imprudent to grant leases. But where none of these contingencies stand in the way, and where estates are under an entail, or in a family that has no idea of parting with them, leasing is unquestionably the most effectual means of raising the value of an estate, as it enables the owner to stipulate for improvements in what way and proportion he pleases, which he cannot do so well in any other manner.

And the author of the "Treatise on modern Agriculture" contends, that nothing gives such a spring to industry as the conviction, founded on the experience of ages, that in this country the fruits of the labours of the industrious man are secured to him. Hence, a farmer will be more or less active in proportion to the security he holds of reaping the fruits of his industry, skill, and capital.

And it is still further stated, that leases are certainly necessary and proper, as a compact between man and man; and

though the mode of cropping and general tenor of the lease must vary according to times and circumstances, yet no man who has thought seriously on the subject will deny that they are for the benefit of both parties, as they secure to the landlord the proper management of the land so leased, and to the tenant the additional profits which may be expected to arise from his superior cultivation of such lands or farms.

But as it is necessary to impose some degree of restraint upon tenants, the means of doing it in such a way that they may not be so fettered as to be prevented from making useful improvements, or left so much at liberty as to do mischief; are the point that forms the principal difficulty. Hence the circumstance to be chiefly guarded against by restrictive penal covenants, are those of preventing the breaking-up of old meadows, pastures, or other lands, the removing away hay, straw, or other materials convertible into manure; and the improving or destroying of timber trees. To enforce the leaving of green winter food; the keeping up of all sorts of fences; the cleansing of water-courses, ponds, pools, &c. and the preserving of buildings, gates, pens, and bridle roads in proper repair. To prevent the forming of rabbit-warrens, and the committing of waste of any kind. And, finally, to regulate the circumstances of the out-going and in-coming tenants with propriety.

But although it is not possible to form any particular lease, so as to include clauses that can apply to every kind of soil, mode of cropping, and general management; yet, as he has had opportunities of perusing a great variety of leases in different parts of England; and as he is in possession of one which is the most perfect of the kind he has seen, it is suggested that it may convey more information on the subject than any explanation that could be otherwise given of it.

*Form of Lease.*

"THIS Indenture, made the \_\_\_\_\_ day of \_\_\_\_\_ in the year of our Lord one thousand eight hundred and \_\_\_\_\_ between A. B. of \_\_\_\_\_ in the county of \_\_\_\_\_ of the first part, and C. D. of \_\_\_\_\_ in the county of \_\_\_\_\_ yeoman of the second part: Witnesseth, That for and in consideration of the rents and covenants, provisos and agreements, hereinafter reserved, expressed, and contained, and which, on the part and behalf of the said C. D., his executors and administrators, are to be paid, done, and performed, he the said A. B. hath demised, leased, setten, and to farm letten; and by these presents doth demise, lease, set, and to farm let unto the said C. D., his executors and administrators, all those messuages, tenements, or farms, called \_\_\_\_\_ situated in the parish of \_\_\_\_\_ and county of \_\_\_\_\_ now or late in the possession of \_\_\_\_\_ together with all and singular houses, out-houses, edifices, buildings, barns, cow-houses, cattle-sheds, stables, yards, garths, slack-garths, gardens, lands, feedings, ways, waters, easements, privileges, and appurtenances whatsoever, to the said demised premises belonging, or in anywise appertaining, except and always reserved out of this present demise, unto the said A. B., his heirs and assigns, all mines, minerals, and quarries, of what nature or kind soever the same may be, as well opened as not opened, lying, being, and remaining within or under the said premises, or which can or may be obtained, or gotten forth, or out of the same, or any part thereof, with liberty to dig brick-earth, and room to work, mould, dry, and burn the same into bricks, in and upon the said hereby demised premises, or any part thereof: And also with full and free liberty, power, and authority, to and for the said A. B., his heirs or assigns, and his and their agents, servants, and work-

L E A S E.

men, at reasonable times in the year, in the day-time, to search for all and every such mines, minerals, quarries, and brick-earth, and to sink pits or shafts, and to make trenches, groves, drifts, water-gates, canals, water-courses, and to direct or turn any water-course, brook, or river, for the winning and working such mines, minerals, and quarries, within the said demised premises, with sufficient ground-room and heap-room for laying the ores, metals, minerals, coals, stones, clay, earth, materials, and rubbish, to proceed, or to be obtained or gotten forth out of the same or any of them; together with full liberty and power to build and erect engines, machines, houses, hovels, lodges, stables, cabins, and other edifices and erections whatsoever, for the effectual winning and working the same: And also full and free liberty of way, leave, and passage in, through, and over the said premises, or any part thereof, to and from the said mines, minerals, quarries, and brick-kilns whatsoever, with carts, wains, waggons, and any other carriage or carriages necessary for leading ores, metals, minerals, coals, stones, cinders, bricks, lime, timber, or any other matter or thing whatsoever, and to make, lay, and place through, over, and upon the said premises, any road or roads, wagon-way or wagon-ways, rail-ways, or any way or ways, canal or canals, for the purpose aforesaid, and from time to time to repair the same, and to do all other acts and things needful or necessary for the winning, working, managing, and carrying on the said mines, quarries, and brick-making, as he or they shall think proper, with liberty to demise or grant to any persons all such liberties as herein before-mentioned: And also, except and reserved unto the said A. B., his heirs and assigns, all timber and other trees, woods, underwoods, and plantations, and the ground and soil thereof, now standing, growing, or being, or which shall hereafter at any time during the continuance of this demise, stand, grow, or be upon the said premises, with liberty to sell, cut down, or lop such timber trees, or other trees, woods, underwoods, and plantations, and to carry away the same, by any means whatsoever: He, the said proprietor, his heirs or assigns, or his or their grantee or lessee respectively, making reasonable satisfaction to the said tenant, his executors or administrators, for the damage or spoil of herbage or ground, to be occasioned by the use or exercise of all and every or any of the liberties aforesaid, such satisfaction to be from time to time fixed and ascertained by two indifferent persons, one to be named by and on the part of the said A. B., his heirs or assigns, and the other by and on the part of the said C. D., his executors or administrators: And also, except and reserved full power and authority for the said A. B., his heirs or assigns, and his and their stewards and agents, with workmen in their company, or without, in the day-time twice, or oftener, in every year during the term hereby demised, to enter in and upon the said premises, or any part thereof, to view the state and condition of the same: And also, except and reserved unto the said proprietor, his heirs and assigns, free liberty to hua, course, hawk, shoot, and fish, in, upon, through, and over all and every the said hereby demised premises, or any part thereof; to have and to hold the said messuage, tenement, or farm-hold, lands, grounds, and all and singular other the premises hereby demised, or mentioned, or intended so to be, with their and every of their appurtenances (except as before excepted), unto the said C. D., his executors and administrators, from the twelfth day of May, in the year of our Lord one thousand eight hundred and \_\_\_\_\_, for and during and unto the full end and term of twenty-one years, from thenceforth next ensuing, and fully to be complete and ended: yielding and paying yearly, and every year during the said term

of twenty-one years hereby demised unto the said A. B., his heirs or assigns, the clear yearly rent or sum of \_\_\_\_\_ of lawful money of Great Britain, by equal half-yearly payments, at two days or times in the year, that is to say, the twenty-second day of November, and the twelfth day of May in every year, by even and equal portions; the first half-yearly payment of the said yearly rent to begin and be made upon the twenty-second day of November next ensuing the commencement of the said term hereby demised: And also yielding and paying yearly and every year unto the said A. B., his heirs or assigns, on the several days and times aforesaid, over and above the said yearly rent of \_\_\_\_\_ the further rent or sum of \_\_\_\_\_ pounds an acre, for every acre of the said demised premises, that he the said C. D., his executors or administrators, shall, at any time or times during the continuance of this demise, break up, tear out, or convert into tillage, or have, or use, or employ in any course of husbandry, contrary to the covenants hereafter contained, without the licence and consent of the said proprietor, his heirs or assigns, in writing for that purpose first had and obtained, and so in proportion for a greater or less quantity than an acre; the first payment of the said additional rent to be made on the first of the aforesaid half-yearly days of payment, which shall happen next after the ploughing, breaking up, tearing out, converting into tillage, or having or using, or employing in any course of husbandry, contrary to the covenants hereinafter contained, any part of the said hereby demised premises, which said two several and respective rents are to be paid as above expressed and reserved, free and clear of all taxes, assessments, charges, and impositions whatsoever, as well parliamentary as parochial, or otherwise, which the said premises now are, or may hereafter be liable to answer or pay: Provided always, and upon condition, and it is the true intent and meaning of these presents, that if it shall happen that the said yearly and other rents herein and above reserved, or any of them, or any part thereof, be behind or unpaid, by the space of forty days next over or after either or any of the said days or times whereon the same ought to be paid as aforesaid, or in case the said C. D., his executors or administrators, shall neglect or refuse to do and perform all and every of the covenants or agreements herein mentioned and contained, on his and their parts, to be paid, done, and performed; or in case the said tenant, his executors or administrators, shall, or do, at any time or times during the term hereby demised, alien, let, or assign over the said premises, or any part thereof, unto any person or persons, without the licence and consent of the said A. B., his heirs or assigns, in writing for that purpose first had and obtained, that then, and in any of the said cases, it shall and may be lawful to and for the said A. B., his heirs or assigns, or such person or persons as shall be by him or them appointed for that purpose, into and upon the said demised premises, or into and upon any part thereof, in the name of the whole, wholly to re-enter, and the same to have again, re-possess, and re-enjoy, as in his and their first and former estate, and from and immediately after such re-entry made, the said term hereby demised shall cease, determine, and become utterly void and of none effect, any thing in these presents contained to the contrary thereof in anywise notwithstanding: And the said A. B. for himself, his heirs and assigns, doth hereby covenant, promise, and agree to, and with the said C. D., his executors and administrators, that it shall and may be lawful to and for the said C. D., his executors and administrators, (he and they paying the rents and performing the covenants and agreements herein reserved and contained, on his and their parts,

## L E A S E.

parts, and to be paid, done, and performed, according to the true intent and meaning of these presents,) peaceably and quietly to have, hold, use, occupy, possess, and enjoy all and singular the said premises, with their appurtenances hereby demised (except as before excepted), for and during the said term of twenty-one years, without the lawful let, suit, trouble, denial, hindrance, molestation, eviction, or interruption of him the said A. B., his heirs or assigns, or any other person or persons, claiming by, from, or under him, them, or any of them: And also, that it shall and may be lawful to and for the said C. D. his executors or administrators (he and they paying the rents and performing the covenants and agreements as aforesaid), in the harvest season next after the expiration of the said term hereby demised, peaceably and quietly to have, cut down, reap and lead the crop of corn or grain by him, them, or any of them, sown and then growing upon two-third parts of the lands then in ploughing or tillage (according to the covenants hereinafter contained, and the true intent and meaning of these presents), commonly called the way-going crop; and the same corn or grain to set in the stack-yards, and thrash the same in the barn or barns of and belonging to the said demised premises: And that he the said C. D., his executors or administrators, shall, for the purposes aforesaid, have the use of all the stack-yards, barns, and granaries of and belonging to the said demised premises, until the twelfth day of May next, after the determination of this demise; and the same corn and grain so thrashed (after payment of rents and arrears of rents then unpaid), shall and may carry away, sell, and dispose of, to and for his or their proper use and benefit, leaving and delivering all the straw of the said way-going crop, as soon as the same is thrashed (as hereinafter mentioned), in and upon the said premises, unto and for the use and benefit of the said A. B., his heirs and assigns, or his or their next succeeding tenant or tenants: And the said A. B., his heirs and assigns, or his or their next succeeding tenant or tenants, shall and will lead the said way-going crop from the lands where it grew to the barns or stack-yards, and fork the same from the loaded carts to the stacks: And also shall and will bear and pay one-half the expence of making and erecting new quick fences upon the said premises, and of cleaning, rearing, and preserving the same for seven years, after being first planted: And also, &c. [Here follow any other covenants on the part of the lessor for new buildings, &c. &c.]

And the said tenant, for himself, his heirs, executors, administrators, and assigns, doth covenant, promise, and agree to and with the said A. B., his heirs and assigns, by these presents, in manner following, that is to say, that the said C. D., his executors or administrators, shall and will well and truly pay, or cause to be paid, unto the said A. B., his heirs or assigns, the said yearly rent or sum of \_\_\_\_\_ and also the other casual or eventual rents herein above reserved, and payable on the days and times, and in manner above mentioned for payment thereof, according to the true intent and meaning of these presents: And also shall and will from time to time, and at all times during the term hereby demised, well and truly pay and discharge all and all manner of taxes, assessments, rates, charges, dues, tithes, and impositions, parliamentary or parochial, whatsoever, which now are, or at any time hereafter during the term hereby demised shall be, taxed, assessed, rated, charged, or imposed upon the said premises, or any part thereof: And also shall and will, from time to time, and at all times during the said term hereby demised, at his and their own charge and expence, repair, uphold, maintain, and keep, with all manner of needful and necessary reparations, all and singular the

houses, buildings, barns, cow-houses, cattle-fleeds, stables, offices, gates, liles, rails, fences, hedges, ditches, drains, and water-courses, of and belonging to the premises hereby demised, or which may at any time hereafter during the said term, be built, erected, or made upon the said premises or any part thereof: And at the end, expiration, or other sooner determination of the said term, shall and will deliver up all and singular the said houses, buildings, erections, barns, cow-houses, cattle-fleeds, stables, offices, gates, liles, rails, fences, hedges, ditches, drains, and water-courses, with their and every of their improvements unto the said A. B., his heirs or assigns, in good and sufficient repair and condition, together with the peaceable and quiet possession thereof: And also shall not, nor will not, at any time or times during the continuance of this demise, sell, dispose of, send or carry away, or permit to be sold or disposed of, sent or carried away from off the said premises hereby demised, any of the hay, straw, clover, turnips, cabbages, or other fodder, that shall grow or be produced from, or made thereon, but shall and will eat and consume the same (for the increase of manure) upon the said premises: And also shall and will, from time to time, during the continuance of this demise, at the proper seasons in every year, duly lay and spread upon the fallow grounds of the said premises (where most requisite and proper for the improvement thereof), in an even, regular, and uniform manner, all the manure, dung, and compost that shall be bred and made on the premises; except the manure, dung, and compost to be bred and made thereon in the year next before the determination of the said term; and which manure, dung, and compost, shall be left in the fold-yards, dung-hills, or midden-steads of the said premises, for the use and benefit of the said A. B., his heirs or assigns, or his or their next succeeding tenant or tenants: And also shall not and will not plant or sow any hemp, flax, or mustard, or any rape for seed\* upon the said premises, or any part thereof: And also shall not, and will not, at any time or times in the year next before the determination of this demise, depature or graze, or suffer to be depatured or grazed upon the said premises, or any part thereof, any larger stock of cattle or greater number of flints than were usually depatured or grazed thereon in the two years next preceding the said last year of the said term, or other sooner determination thereof: And also shall and will yearly, and every year during the said term hereby demised, catch and destroy the moles, and seals, mould, dres, and clean the grass-grounds of and belonging to the said demised premises: And also shall and will thrash the way-going crop, at the determination of the said term, in an uniform manner, so as to deliver a constant, regular, daily supply of straw to and for the use of the said A. B., his heirs or assigns, or his or their tenant or tenants: And also shall and will, from and after the first day of October preceding the termination of the said term, hain, free, and keep uncaten, all those fields or parcels of ground sown with grass-feed in the last fifteen months of the said term; save and except that it shall and may be lawful for the said C. D., his executors and administrators, from and after the first day of April next before the end of the said term, to depature, with not more than \_\_\_\_\_ sheep an acre, one-half of the said hained clover or new grass, which half shall be chosen and set out by the agent of the said A. B., his heirs or assigns, in the month of March preceding: And also shall and will permit the said A. B., his heirs or assigns, or his or their tenant or tenants, to sow with grass-seeds all or any part of the lands sown with corn or grain, for the way-going crop, and to roll in the same with a roller drawn

\* Rape for green food is allowed.

by hores, according to the custom of the country: And also shall and will permit and suffer the said proprietor, his heirs or assigns, or his or their servants, draughts, and workmen, from time to time, and at all times, from and after the first day of December preceding the determination of this demise, to enter into and upon all the then fallow grounds of the said premises, or the grounds which, according to the true intent and meaning of these presents, ought to be in true use, and the same to plough, sow, harrow, dress, manure, lime, and prepare for such course of agriculture as he or they shall think proper to convert the same into, without the let or hindrance of him the said C. D., his executors or administrators: And also shall not, and will not, have, use, or employ, in ploughing or tillage, a greater quantity of land than \_\_\_\_\_ acres of the said premises at any one time, or in any one year, during the term hereby demised: And also shall and will yearly, and every year during the term hereby demised, summer fallow † at least one-third part of the tillage, and plough the same at least

several times, at proper seasons in each year, and keep the same free and clear from quick-ins, wild oats, thistles, coltsfoot, runch, dead nettles, and every other pernicious plant or weed, and lay and spread upon every acre of such fallow, in an even and regular manner, at least

fother of well-turned clod-lime, or in lieu thereof twenty fother of good well-rotted dung, and so in proportion for a less quantity than an acre: And also shall not, and will not, have, keep, or continue in ploughing or tillage, any part of the said demised premises, more than \_\_\_\_\_ years at one time, that is from being ploughed out from grafs, to being laid down to grafs again: And also shall and will yearly, and every year, fow with grafs-seeds, and lay down to grafs, at least one-third part of the ploughing or tillage-lands, after a clean summer fallowing, and a crop of wheat, or a crop of turnips and white corn, and fow upon every acre thereof at least eight pounds of red clover seed, three pounds of white clover, three pounds of rib-wort plantain, and two pecks of rye-grass ‡ of the best quality; the quantity and quality to be ascertained by proper vouchers from the persons of whom the said seeds were bought, and by whom the said seeds were sown: And also shall and will, whenever any part of the ploughing or tillage lands are laid to grafs, keep and continue the same in grafs at least \_\_\_\_\_ years before the same, or any part thereof, be again ploughed out, or converted into tillage: And also shall and will, in the last three years of the said term, lay down to grafs as aforesaid, or have in grafs, and at the end thereof leave in grafs, all those fields or parcels of land, called \_\_\_\_\_ And also shall and will, during the whole of the said term, keep in grafs, and at the expiration thereof leave in grafs, all those fields or parcels of land § \_\_\_\_\_ And also all such lands as shall be converted into watered meadows: And also shall and will during the term hereby demised, bear and pay one-half the expence of making and erecting new quick fences upon

† On the fallow turnips should be sown, if a proper soil, or cabbages, or drilled beans, at thirty inches distance.  
‡ To these, upon light soils, are generally added three or four pounds of yellow hop-clover.  
§ This blank is sometimes filled up with two or one, according to soil, situation, and circumstances, and weak soils, improper for corn, generally continue in grafs five, six, or seven years, until it is thought they want refreshing by tillage, which is only used in such situations, as being subterfuge to rearing stock.

§ This covenant is used only in such situations where there are any rich old grazing lands.

the said premises, and of cleaning, rearing, and preserving the same for seven years after being first planted. [Here follow any other particular covenants that circumstances may require.]

In addition to this general form of lease, others with particular covenants become necessary for each particular sort of farm.

**LEASE, Valuation of,** the mode of finding out and ascertaining the value of leasehold property, in which the circumstances that are to be more particularly attended to are those of the peculiar nature or conditions of the lease, and the difference between the lease rent, and the full or actual rental value; as all sorts of leases, where the rent payable is not equal to the just or true rental value at the period of their being sold, lessen the value of the land, and are obviously an incumbrance in different points of view. The mode of managing this business with propriety, according to a late writer, is, after ascertaining the difference between the lease rent and the full rental value (incumbered with the same outgoings and repairs as the lease rent), to multiply it by the number of years that are unexpired, deducting the product in full from the value of the land free from such incumbrance; and from the product thus found, to further deduct half the interest thereof during the said number of years, together with that of one-half year over, where the rent is payable half yearly, and one year where it is payable annually; as all that a purchaser of this sort of property has a right to expect, is that of receiving the full rent for his land during the continuance of such lease or engagement. See *Valuation of Landed Property*.

**LEASE, in Agriculture,** a provincial term that implies grassy ground, meadow-ground, or any unploughed ground kept for the use of cattle.

**LEASE and Release, in Law,** is a conveyance of the fee-simple, right, or interest in lands or tenements, under the statute of Uses, 27 H. VIII. cap. 10. giving first the possession, and afterwards the interest, in the estate conveyed. This species of conveyance was first invented by Sir John Moore, soon after the statute of Uses, and it is now the most common of any, and not to be shaken. Though the deed of feoffment was the usual conveyance at common law; yet since the stat. of 27 Hen. VIII. of uses, the conveyance by lease and release has taken place of it, and is become a very common assurance to pass lands and tenements; for it amounts to a feoffment, the use drawing after it the possession without actual entry, &c. and supplying the place of livery and seisin, required in that deed: in the making of it, a lease, or bargain and sale for a year, or such like term, upon some pecuniary consideration, is first prepared and executed, to the intent that by virtue thereof the lessee may be in actual possession of the lands intended to be conveyed by the release, and thereby and by force of the statute 27 Hen. VIII. c. 10. for transferring of uses into possession, be enabled to take and accept a grant of the reversion and inheritance of the said lands, &c. to the use of himself and his heirs for ever. Upon which the release is accordingly made, reciting the lease and declaring the uses; and in these cases a pepper-corn rent in the lease for a year is a sufficient reservation to raise an use, to make the lessee capable of a release. (2 Vent. 35. 2 Mod. 262.) This is held to supply the place of livery of seisin; and so a conveyance by lease and release is said to amount to a feoffment. (Co. Lit. 270. Cro. Jac. 204.) Black. Com. b. ii. Tomlin's Jacob Dict. vol. ii. tit. LEASE and RELEASE. See BARGAIN and SALE, and CONVEYANCE.

The form of this conveyance is originally derived to us from the common law; and it is necessary to distinguish in what

what respect it operates as a common-law conveyance, and in what it operates under the statute of Uses. At the common law, where the usual mode of conveyance was by feoffment with livery of seisin, if there was a tenant in possession, so that livery could not be made, the reversion was granted, and the tenant attorned to the reversioner. As by this mode the reversion or remainder of an estate might be conveyed without livery, when it depended on an estate previously existing, it was natural to proceed one step further, and to create a particular estate for the express and sole purpose of conveying the reversion; and then by a surrender or release, either of the particular estate to the reversioner, or of the reversion to the particular tenant, the whole fee vested in the surrenderer or releasee. It was afterwards observed, that there was no necessity to grant the reversion to a stranger; and that if a particular estate was made to the person to whom it was propounded to convey the fee, the reversion might be immediately released to him, which release operating by way of enlargement, would give the releasee (or releasee as he is sometimes termed) a fee. In all these cases the particular estate was only an estate for years; for at the common law the ceremony of livery of seisin is as necessary to create even an estate of freehold, as it is to create an estate of inheritance. Still an actual entry would be necessary on the part of the particular tenant; for without actual possession the lessee is not capable of a release, operating by way of enlargement. But this necessity of entry for the purpose of obtaining the possession, was superseded or made unnecessary by the statute of Uses (27 Hen. VIII. c. 10. above alluded to); for by that statute the possession was immediately transferred to the *cestui que use*; so that a bargainee under that statute is as much in possession, and as capable of a release before or without entry, as a lessee is at the common law after entry. All, therefore, that remained to be done to avoid on the one hand the necessity of livery of seisin from the grantor, and to avoid on the other the necessity of an actual entry on the part of the grantee, was, that the particular estate (which, for the reasons above-mentioned, should be an estate for years) should be so framed as to be a bargain and sale within the statute. Originally it was made in such a manner as to be both a lease at the common law, and a bargain and sale under the statute; but as it is held, that where conveyances may operate both by the common law and statute, they shall be considered to operate by the common law, unless the intention of the parties appears to the contrary, it became the practice to insert, among the operative words, the words *bargain and sell* (in fact, it is more accurate to insert no other operative words); and to express that the bargain and sale, or lease, is made to the intent and purpose that thereby, and by the statute for transferring uses into possessions, the lessee may be capable of a release. The bargain and sale therefore, or lease for a year, as it is generally called, operates, and the bargainee is in the possession, by the statute. The release operates by enlarging the estate or possession of the bargainee to a fee. This is at the common law; and if the use be declared to the releasee in fee-simple, it continues an estate at the common law; but if the use be declared to a third person, the statute again intervenes, and annexes or transfers the possession of the releasee to the use of the person to whom the use is declared. It has been said, that the possession of the bargainee under the lease is not so properly merged in, as enlarged by, the release; but at all events it does not, after the release, exist distinct from the estate passed by the release. 1 Inst. 271. b. in n.

As the operation of a lease and release depends upon the lease, or bargain and sale; and if the grantor is a body corporate, the lease will not operate under the statute of Uses;

for a body corporate cannot be seized to an use, and therefore the lease of possession, considered as a bargain and sale under the statute, is void; and the release then must be of no effect for want of a previous possession in the releasee. In cases of this nature, therefore, it is proper to make the conveyance by feoffment, or by a lease and release with an actual entry by the lessee previous to the release; after which the release will pass the reversion. It may also be observed, that in exchanges, if one of the parties die before the exchange is executed by entry, the exchange is void. But if the exchange be made by lease and release, this inconvenience is prevented, as the statute executes the possession without entry; and all incidents annexed to an exchange at common law will be preserved. 1 Inst. 271. b. in n.

When an estate is conveyed by lease and release, in the lease for a year there must be the words, *bargain and sell* for money, and five shillings or any other sum, though never paid, is a good consideration, whereupon the bargainee for a year is immediately in possession on the executing of the deed, without actual entry: if only the words *demise, grant and to farm let* are used, in that case the lessee cannot accept of a release of the inheritance, until he hath actually entered, and is in possession. (2 Ld. Abr. 435.) But where Littleton says, that if a lease is made for years, and the lessor releases to the lessee before entry, such release is void; because the lessee had only a right, and not the possession; and such release shall not enure to enlarge the estate, without the possession: though this is true at common law, it is not so now upon the statute of Uses. (2 Mod. 250, 251.) And if a man make a lease for life, remainder for life, and the first lessee die; on which the lessor releases to him in remainder, before entry; this is a good release to enlarge the estate, he having an estate in law capable of enlargement by release, before entry had. 1 Inst. 270.

No person can make a bargain and sale, who hath not possession of the lands: but it is not necessary to reserve a rent therein; because the consideration of money raises the use. If a lease be without any such consideration, the lessee hath not any estate till entry, nor hath the lessor any reversion; and therefore a release will not operate, &c. (1 Inst. 270, 278. Cro. Jac. 169. 1 Mod. 263.) On lease at will, a release shall be good by reason of the privity between the parties; but if a man be only tenant at sufferance, the release will not inure to him; and as to the person who hath the reversion it is void, for such tenant hath not any possession, there being no estate in him. Lit. § 461, 462. Cro. Eliz. 21. Dyer 251.

In a lease and release, to make a tenant to the *precipe* to suffer a recovery, where the release is made to A. B., and his heirs (*viz.* the tenant to the *precipe*), it must be also said to the use of him the said A. B., and his heirs and assigns for ever; for the releasee must be absolute tenant of the freehold. (2 Vent. 312. Lil. Conveyance, 251.) And a release made on trust, must be to A. B., his heirs and assigns, to the only use and behoof of the releasee, his heirs and assigns for ever; in trust for C. D., who is to be a party to the deed, and the purchase-money to be paid by the *cestui que trust*. If the words *to the use*, &c. are not inserted in the release, the estate doth not execute by the statute of Uses, and the trust is void. Lil. Conv. 231, 251. See RECOVERY and TRUST.

A lease and release make but one conveyance, being in the nature of one deed. 1 Mod. 252. See RELEASE.

LEASEHOLD Tenure of Lands, in Agriculture, is that sort of tenancy which is held under lease or special agreement for any definite term, whether of lives or years; which also admits of several distinctions, as, where the term is for

for a great length of time, as a thousand years, and where it is for life, of which there are different kinds, as where the fine is certain, or under certain limitations on renewal, with an uncertain fine; payable to a proprietor or other superior, who has merely reserved a conventional rent, the tenant having given a sum of money to obtain the lease and the right of alienation; this is a practice common in the western counties: with an uncertain fine payable to a proprietor, who receives the full rent of the land at the time of granting the lease, the landlord having a power of alienation; this is a practice common in Wales, and some parts of this country: and where it is for an ordinary term, (as for less than 100 years,) with the power of alienation. They are all tenures, which give a sort of temporary property or interest in the lands, by which they are rendered liable to bargain or sale as other sorts of property by the holders of them. See TENANT and TENURE.

LEASH, or LEASHE, among *Sportsmen*, denotes three creatures of any kind; but chiefly greyhounds, foxes, bucks, and hares.

We say a leash of greyhounds, a couple and a half of hounds.

LEASING, or LESING. See GLEANING.

LEAT, is used for a trench to convey water to or from a mill. It is mentioned in the statute 7 Jac. I. cap. 19.

LEATHER, in *Commerce*, the skins of several sorts of beasts dressed and prepared for the use of various manufacturers, whose business is to make them up, according to their different employments. The butcher and others, who flay them off the carcasses, dispose of them raw or salted to the tanner and tawer; they to the shamoy, morocco, and other kind of leather-dressers, who prepare them according to their respective arts, in order to vent them among the curriers and leather-cutters, glovers, harness-makers, coach-makers, fadlers, breeches-makers, gilt-leather-makers, chair-makers, shoe-makers, book-binders, and all in any way concerned in the article of leather.

Leather has divers names according to the state wherein it is, and according to the different kinds of skins of which it is prepared, and its peculiar qualities when so prepared. 1. The skin is raw as it comes off the animal. 2. Some are salted with sea-salt and alum, or with natron, which is a species of salt-petre, or white salt-wort, to prevent corruption in keeping, or sending to distant tanneries during hot seasons.

Skins dried with the hair on, are commonly those of oxen and cows, or buffaloes, either tame or wild. Most of those in France come from foreign countries. The places which furnish the largest quantity, are Peru, the isle of St. Domingo, Barbary, Cape Verde Isles, the river Senegal in Africa, Muscovy, Ireland, the island of Cuba. Those of this latter place are the most esteemed; they are called Havana skins, from the name of the capital city of that island, whither they are carried in order to be sent to Spain, and from thence into other parts of Europe. After these skins are stripped of their hair, they are sold to the tanners. See CURRYING, TANNING, and SKINS.

The three principal assortments of leather are tanned or tawed, and oil and alum leather, all which are dressed in some yards.

The art of dressing leather in oil consists in first soaking the skins; then throwing them into the lime-pit; and when they are taken hence, pulling them and delivering them to the friezier; they are then struck with the oil, and sent to the mill; when they are milled sufficiently; they are thrown into the ditch to be scoured, and by some scudded, and afterwards hung upon the hooks to dry. When they have been

weighed and marked by the proper officers, in order to fix the excise duty, they are fit for sale. The sorts of skins dressed in oil are those of deer, sheep, and lambs, and some few of goat, and the oil used for this purpose is Newfoundland, or cod's liver oil. The alum leather-dressers' art consists in properly soaking, liming, wringing, (an operation sometimes omitted,) and striking them in a liquor composed of water, salt, and alum, and then drying them properly. The sorts of skins dressed in alum are those of sheep and lambs, and a large quantity of kid. Postleth. Dict. Com. art. *Leather*.

There are several statutes relating to leather; the 27 Hen. VIII. c. 14 directs packers to be appointed for leather to be transported: but the 18 Eliz. c. 9. prohibits the shipping of leather on penalty of forfeiture, &c. Though by 20 Car. c. 5. transportation of leather was allowed to Scotland, Ireland, or any foreign countries paying a custom or duty; which statute was continued by divers subsequent acts.

No person shall ingross leather to sell again, under the penalty of forfeiture. None but tanners are to buy any rough hides of leather, or calves' skins in the hair, on pain of forfeiture; and no person shall forsell hides, under the penalty of 6s. 8d. a hide. Leather not sufficiently tanned is to be forfeited. In London, the lord mayor and aldermen are to appoint and swear searchers and sealers of leather out of the company of cordwainers, &c. and also triers of the sufficiency of leather; and the same is to be done by mayors, &c. in other towns and corporations; and searchers allowing insufficient leather, incur a forfeiture of 40s. Shoemakers making shoes or boots of insufficient leather are liable to forfeit for every pair 3s. 4d. and the value thereof. (1 Jac. I. c. 22.) Red tanned leather is to be brought into open leather markets, and searched and sealed before it be exposed to sale, and on sale is to be registered, or shall be forfeited; and contracts for sale otherwise to be void. (13 & 14 Car. II. c. 7.) Hides of leather are adjudged the ware and manufacture of the currier, and subject to search, &c. All persons dealing in leather may buy tanned leather, searched in open market, and any person may buy or sell leather, hides, or skins, by weight. 1 W. & M. c. 33.

The first statute concerning leather, which it is necessary for us to refer to in this article, is the 1 Jac. c. 22, which reduces all preceding acts relating to that commodity into one; and therefore to this we shall have a retrospect in the progress of this article; premising that all forfeitures by this act, not otherwise specially directed, shall be divided, one-third to the king, one-third to him that shall sue, and one-third to the city, town, or lord of the liberty. By 9 Ann. c. 11. any two justices near the place where the forfeitures are incurred, or offence committed, may hear and determine the same. All forfeitures, by the act of 13 & 14 Car. II. c. 7. shall be recovered in any court at Westminster, or in any court of record in the city, &c. where the offence shall be committed; to be distributed half to the king, and half to the informer. By 39 & 40 Geo. III. c. 66. it is enacted that proper places and times for inspecting all raw hides and skins of cattle, sheep, horses, and hogs, shall be fixed by the mayor, bailiff, or head-officer of any city, town corporate, borough, or market-town, or any two magistrates acting for the same, or any two justices acting for the division within or nearest to such city, &c. The manner of appointing inspectors is also prescribed by the said acts. And by the same, butchers, &c. who are chargeable with willfully or carelessly injuring hides, so as to make them less valuable, are liable to penalties, not exceeding 5s. (47 Geo. III.) nor less than 1s. for the raw hide of every ox, bull,

## LEATHER.

bull, cow, or heifer, &c.; and not exceeding 2s. 6d. (41 Geo. III.) nor less than 6d. for the skin of every calf; and not exceeding 2s. 6d. (41 Geo. III.) nor less than 1s. for the hide of every horse, mare, or gelding; and not exceeding 6d. nor less than 3d. for the hide of every hog, pig, sheep, or lamb. Inspectors are required to take a prescribed oath, and are allowed certain fees for examining and inspecting hides. &c. (See also 43 Geo. III. c. 106.) These inspectors may impose penalties for damaging hides, &c.; which penalties shall be recovered before a justice, one-half of which, by 41 Geo. III. c. 53. shall be given to the inspector, and the other half applied to the purpose of better carrying on the objects of these acts. By the above-cited acts, 39 & 40 Geo. III. c. 66, the inspectors of raw hides shall provide proper stamps, and stamp the hides, not damaged or otherwise; and seize such hides or skins as have been damaged, and sell the same, provided the penalties be not paid in less than 48 hours after such seizure. Butchers or others neglecting to bring hides to be marked, shall forfeit not exceeding 5l. nor less than 40s. for every such hide. The regulations of this act shall extend to all hides found in Great Britain. (41 Geo. III. c. 53.) All disputes shall be settled by any five impartial and respectable persons concerned in the manufacture of leather, summoned by a magistrate, before whom such dispute shall be brought. All penalties and forfeitures shall be recovered before one justice or magistrate of any city, town, or place, where the offence shall be committed, upon conviction, confession, or the oath of one witness, and levied by distress; and for want of sufficient distress, the offending party shall be committed by such justice or magistrate to the common gaol or house of correction, for a time not exceeding one month. All penalties and forfeitures, not otherwise disposed of, shall go, half to the informer, and half to the execution of the purposes of the act. Persons aggrieved may appeal to the next sessions. (39 & 40 Geo. III. c. 66.) By the same and 41 Geo. III. c. 53, informations for offences against this act for wilfully or carelessly gashing raw hides, shall be laid within three days after the commission of the offence; and for any other offence within 14 days after the offence committed. By 43 Geo. III. c. 106, the provisions of 39 & 40 Geo. III. c. 66, and 41 Geo. III. c. 53, are extended to London, Westminster, and Southwark, and to all places within fifteen miles of the Royal Exchange. All raw hides within five miles of the Royal Exchange shall be brought to Leadenhall market, and the skins of sheep and lambs to one of the three sheep-skin markets in Southwark, the Whitechapel market, or the market at Wood's Clove. Proper places and hours for inspection are to be appointed within three months after the passing of this act. For the market at Leadenhall, eight inspectors are to be appointed; four from the company of butchers, two by the company of curriers, and two by the company of cordwainers; and besides, there shall be appointed four inspectors for the sheep market at Wood's Clove, two for Southwark, and two for the market of Whitechapel. One half of the inspectors at each of the three last-mentioned markets to be appointed by the company of butchers, and the other half at each of such markets in equal proportions by the companies of curriers and cordwainers. Provision is made for increasing their number and regulating their attendance. Inspectors for Leadenhall market are required to attend on the usual market days, from six in the morning till five in the afternoon, from the 25th of March to the 20th of September; and from seven in the morning until four in the afternoon, from the 30th of September till the 24th of March.

The distribution of fines and fees is prescribed, so that one-

half shall be equally divided between the inspectors, acting at the respective markets, and the remaining half-part shall be paid weekly to the arbitrator of the market, in respect to which they are received, and paid monthly by the said arbitrators to the respective persons appointed by the courts of assizants to receive the same. There is a penalty for impeding inspectors, not exceeding 5l. nor less than 10s. for each offence, and also a penalty not exceeding 20l. on inspectors receiving, and persons offering bribes. Salfemen are required to deliver an account of hides or skins sold, under a penalty for every offence of 10l. The lord-mayor of London is empowered to increase the fees of the inspectors, under the representation of the courts of assizants of the companies concerned, to any sum not exceeding 1d. for every hide, ½d. for every calf-skin, hog-skin, or pig-skin, and ¼d. for every sheep or lamb-skin. The respective courts of assizants are required to appoint annually four arbitrators, to settle disputes arising in any of the markets above-mentioned; and these arbitrators are empowered to fine inspectors, and also butchers and salfemen, for frivolous deceptions and exorbitant impositions. Inspectors and arbitrators are liable to be dismissed for misconduct in their respective offices, or to a fine not exceeding 5l. nor less than 10s. Buyers and sellers of unstamped hides or skins are liable to a forfeiture not exceeding 20s. nor less than 5s. for every hide; and not exceeding 5s. nor less than 1s. for every skin of hogs, pigs, or calves; and not exceeding 1s. nor less than 6d. for every sheep or lamb-skin. The treasurers are appointed by the respective courts of assizants to receive the sums collected by the arbitrators; one-half of which shall be paid to the treasurer appointed by the company of butchers, one-fourth to the officer of the company of curriers, and one-fourth to the officer of the company of cordwainers; which sums shall first of all be applied for the execution of the acts, and to the use of the poor of the said companies.

For particular regulations concerning *tanners* and *curriers* of hides, see these articles respectively. The mayor and aldermen of London (on pain of 40l. for every year they make default, half to the king and half to him that shall sue) shall yearly appoint eight freemen of some of the companies of cordwainers, curriers, salfers or girdlers, of whom one shall be a sealer, and keep a seal for the sealing of leather; they shall be sworn to do their office truly; and they shall search and view all tanned leather brought to market, whether it is thoroughly tanned and dried: and if it is, shall seal the same. Four of these officers shall be changed every year; no officer shall be continued above two years together, nor be re-elected till after the end of three years, on pain of 10l. a month. A similar regulation extends to other places. The wardens of the curriers shall search and seal curried leather, for which they are entitled to fees, to be paid by the currier; on pain of forfeiture for every hide not searched and sealed, 6s. 8d. If any searcher or sealer shall neglect his office or misbehave, he shall forfeit 40s.: if he shall take a bribe, or exact a fee not appointed, he shall forfeit 20l.; and if he shall refuse to execute his office, he shall forfeit 10l. If any person shall hinder the searcher in the execution of his office, he shall forfeit 5l. (1 Jac. c. 22.) The mayor of London (on pain of 5l. half to the king, and half to him that shall sue) shall, within six days after notice given of any seizure of any leather, red and unwrought, appoint six triers, two of the cordwainers, two of the curriers, and two of the tanners, using Leadenhall market, who, upon their oaths taken before him, shall, on the second or third market-day for leather, try the same, whether it be sufficient or not. The same regulation extends to other places. Triers not doing their duty shall forfeit 5l. The offering for sale of unsearched and

## LEATHER.

and unsealed leather incurs a forfeiture of the same, or its value, and for every hide or piece 6*s.* 8*d.*; and for every dozen of calves' skins, 3*s.* 4*d.*; but no person shall incur any penalty for selling or buying any sheep-skins, unsealed or unsealed. (1 Jac. c. 22. 4 Jac. c. 6.) All red tanned leather shall be bought only in the open fair or market, and not in any house, yard, shop, or other place, on pain of forfeiting the same, or its value, and rendering the contract void: and such leather shall be searched and sealed before sale, and on sale shall be registered, on pain of forfeiting the same, or its value. (13 & 14 Car. II. c. 7.) Searchers and sealers shall keep a register of all bargains made for leather, during the fair or market, with the prices; taking for searching, sealing, and registering of every ten hides, or butts, of the seller 2*d.*, and so in proportion; and for every six dozen of calves' skins, or sheep-skins, 2*d.*: and of the buyer after the same rate. Red tanned leather, brought into London, or within three miles of it, shall be brought to Leadenhall, to be viewed and registered by the searchers, with half such fees to be paid for tanned leather bought out of London, or within three miles, and searched and sealed before it be brought within the city; on pain that every person housing, or not bringing his leather to Leadenhall, shall forfeit for every hide or skin 6*s.* 8*d.* No person shall buy any tanned leather, unwrought, but who shall work the same into wares, on pain of forfeiting the same, or value. (1 Jac. c. 22.) But by 12 Geo. II. c. 25, all persons who deal or work in leather may buy all sorts of tanned leather in open fair or market, whether curried or uncurried, being first searched and sealed, and may cut the felt the same in any small pieces in their open shops. (See also 1 W. sess. 1. c. 33.) Within London, or within three miles, no person shall sell any wares appertaining to the mystery of any artificer cutting leather, but only in open shop, common fair, or market, whereby the wardens may have search thereof: on pain of forfeiting the same, and also 10*s.* 1 Jac. c. 22.

No shoemaker shall make any boots or shoes, or any part of them, except of leather, well and truly tanned and curried, or of leather well and truly tanned only; nor put into any part of any shoes or boots, any leather made of a sheep-skin, bull-hide, or horse-hide, &c. &c., on pain of forfeiting for every pair of shoes or boots 3*s.* 4*d.*, and the value. And if any artificer using leather do make any wares of any tanned leather insufficiently tanned, or of tanned and curried leather, not sufficiently tanned and curried, he shall forfeit the same, and value. If any shoemaker or cobbler within London, or three miles of it, shall put any tanned leather into any boots or shoes, or other things made of tanned leather, which shall not be well and perfectly tanned, or do put any curried leather into boots or shoes, or any things made of leather, which shall not be sufficiently tanned and curried, and also sealed; he shall forfeit the same and value. 1 Jac. c. 22.

All sorts of leather and skin, tanned or dressed, may be exported. 20 Car. II. c. 5. 9 Ann. c. 6.

By 43 Geo. III. c. 69, a duty is laid upon all hides and skins, vellum and parchment, imported; and drawbacks allowed on the exportation of them. Other duties are also imposed by 49 Geo. III. c. 98. for which we refer to the act, sched. A. After the duty on importation shall be paid, the officers of the customs shall cause every hide or skin to be marked, to denote the payment of the duty. (9 Anne. c. 11.) But by 15 Geo. III. c. 35, raw or undressed goatskins may be imported for five years, duty free; and this act was made perpetual by 31 Geo. III. c. 43. The several duties for and upon all hides and skins, and parts and

pieces of hides and skins, tanned, tawed, or dressed, to be paid by the tanners, tawers, and dressers of hides and skins respectively, and the duties upon vellum and parchment, to be paid by the respective makers thereof; and certain drawbacks are allowed on the exportation thereof. By tanned hides or skins, or pieces thereof, are meant only such as are tanned in wooze, made of the bark of trees, or slumack; and by hides and skins, dressed in oil, are meant such as are made into leather in oil, or with any materials, of which the chief ingredient shall be oil; and by tawed hides or skins, are meant such as are dressed or made into leather, in alum and salt, or meal, or other ingredients properly used by tawers of white leather. 9 Ann. c. 11. f. 3.

By 43 Geo. III. c. 69, every tanner shall take out a licence annually, for which he shall pay, if within the bills of mortality, 5*s.*, elsewhere 2*l.* 10*s.*, on pain of 30*l.* (24 Geo. III. c. 41. Sect. 2. § 1.) And every tawer shall take out a licence annually, for which he shall pay 1*l.* on the penalty of 10*l.* And every dresser of hides in oil shall take out a licence annually, for which he shall pay 2*l.* on the penalty of 20*l.* And every currier shall take out a licence annually, for which he shall pay 2*l.* on the penalty of 20*l.* And every maker of vellum or parchment shall take out a licence annually, for which he shall pay 1*l.* on the penalty of 10*l.* And every person who shall take out such licences shall renew them annually, ten days before their expiration, on the penalties above stated. Collar-makers, glovers, bridle-cutters and others, who dress skins or hides, or pieces thereof, in oil, alum, and salt, or meal, or other ingredients, and who cut and make the same into wares, shall be accounted tawers, or dressers. (2 Ann. c. 11. § 25.) Any hide or skin, which hath once paid the duty, shall not be charged under any other denomination (9 Ann. c. 11. § 3.) The commissioners of these duties, appointed by the commissioners of the treasury, shall have the same power as the commissioners of excise. Tanners, tawers, carriers, or dressers of hides or skins, and makers of vellum or parchment, are required to give notice in writing to the officer, of their names and places of abode, and of their tan-houses, yards, work-houses, mills, or other places where they intend to tan, taw, or dress hides or skins, or make vellum or parchment, before they use the same; on pain of 50*l.* Those who use such places without entry of them, shall forfeit 20*l.* and the goods found in them, or their value, shall also be forfeited. The officers, at all reasonable hours, shall enter and survey these places, and if the owner or occupier refuse them entrance, he shall forfeit 10*l.* And if any hide or skin, tanned, tawed, or dressed in oil, be found in any place not entered, without a stamp denoting that the duty has been charged, the same shall be forfeited and seized; and the persons in whose possession it shall have been found, shall for each offence forfeit 100*l.* (41 Geo. III. c. 91. § 10.) Tanners and others shall give two days notice to the proper officers of the removal of goods to the drying place, that an account of them may be taken; and before they are carried away from the drying place, two days notice shall be given; and they shall be entered with the officer with respect to their number and quality, and verified on oath before a justice of peace, collector or supervisor; nor shall they be removed, till the duty be first charged, entered and marked. The penalty for neglect is 20*l.* and forfeiture of the goods, or their value. Concealment of any hide or skin, vellum or parchment, in order to avoid the duty, incurs a forfeiture of 20*l.* and the goods or their value. If any tanner or other person shall shave any hide or calf-skin, before the same be thoroughly tanned, so as to impair it and diminish the duty, the same or its value shall be forfeited. Tanners or other such person shall keep



## LEBANON.

and Theodoret also states it to be the highest of all Palestine. Modern travellers concur in this account of its great height. "Scarcely," says Volney, "do we depart from Larnaca in Cyprus, which is 36 leagues distant, before we discover its summit capped with clouds. This is also distinctly perceivable on the map, from the course of the rivers. The Orontes, which flows from the mountains of Damascus, and loses itself below Antioch; the Kefnia, which, from the north of Balbec, takes its course towards Tyre; the Jordan, forced by the declivities towards the south, prove that this is the highest point." Although the height of this mountain has not been determined by the barometer, Volney deduces it from another consideration. In winter the tops of the adjoining mountains are entirely covered with snow from Alexandretta to Jerusalem; but after the month of March it melts, except on mount Lebanon, where, however, it does not remain the whole year, except in the highest cavities, and towards the N.E., where it is sheltered from the sea-winds and the rays of the sun. Since it is well known that snow in this latitude requires an elevation of 15 or 16 hundred fathoms, we may conclude, says Volney, that to be the height of Lebanon, and that it is consequently much lower than the Alps, or even the Pyrenées. Mount Blanc, the loftiest of the Alps, is estimated at 2488 fathoms above the level of the sea; and the peak of Ollian, in the Pyrenées, at 1000. Lebanon, which gives its name to the whole extensive chain of the Kefraouan, and the country of the Druzes, presents us every where with majestic mountains. At every step we meet with scenes, in which nature displays either taller grandeur, sometimes singularity, but always variety. When we land on the coast, the loftiness and steep ascent of this mountainous ridge, which seems to inclose the country, these gigantic masses, which shoot into the clouds, inspire astonishment and awe. Should the curious traveller then climb these summits which bounded his view, the wide extended space which he discovers becomes a fresh subject of admiration; but completely to enjoy this majestic scene, he must ascend the very point of Lebanon, or the "Sannin." There, on every side, he will view an horizon without bounds; while, in clear weather, the sight is lost over the desert, which extends to the Persian gulf, and over the sea, which bathes the coasts of Europe. He contemplates, besides rocks, woods, torrents, hill-sides, villages, and towns, which are nearer and more distinct objects, the valley obscured by stormy clouds, and smiles at hearing the thunder, which had so often burst over his head, growling under his feet; while the threatening summits of the mountains are diminished till they appear only like the furrows of a ploughed field, or the steps of an amphitheatre, and he feels himself flattered by an elevation above so many great objects, on which pride makes him look down with a secret satisfaction. Such is the picturesque description of Volney, which he pursues more in detail. Mount Lebanon is computed at about 100 leagues in compass, and is bounded by Mesopotamia on the E., Armenia on the N., Palestine on the S., and the Mediterranean on the W. It consists of four ridges of mountains, which rise one above the other; the first of these is very fertile in grain and fruit; the second is barren and rocky, producing nothing but briars and thorns; the third, though still higher, is said to enjoy a constant verdure and spring, its gardens and orchards producing such a variety of herbs, fruits, &c. that it hath been styled an earthly paradise; the last and loftiest is uninhabitable, by reason of its excessive coldness, being covered with deep snows almost all the year. It is mostly inhabited by the Maronites below,

and by the wild Arabs, called Amadea, of the feet of Hali, every where else but on the top. Here are several churches, convents, and chapels, and caverns cut into the rock. The Monks that inhabit it are very poor, but courteous to travellers, from whom they expect some token of beneficence. The convent, or cenobium, where the Maronite patriarch resides, lies almost in a bottom; the descent to it is very steep, narrow, and winding, and it has only that one avenue, which makes it so much the safer, as well as the more retired. It chiefly consists of fundry grotts, cut into the rock; of which the church is one of the largest. A river which empties itself at Tripoli, runs a little below it, and supplies it with water. Near the grott of St. Marina, who is reputed to have lived here as an hermit, in man's clothes, are some vines, which afford excellent wine; and fine young mulberry trees, as well as cedars, and other curiosities. Of the boasted cedars of Lebanon, there are no very magnificent remains; four or five of them only deserving notice: but the number of firs, oaks, brambles, mulberry trees, figs, and vines, is much more considerable. The wines of Lebanon have been much extolled by the Grecian and Roman epicures. It is probable, that the inhabitants of this territory have made no change in their ancient method of making wines, nor in the culture of their vines. They are disposed on piles of six or eight feet in height. They are not pruned as in France, which must certainly, says Volney, greatly injure both the quantity and quality of the crop. The vintage begins about the end of September. The convent of Mar-hanna makes about 150 rabia, or earthen jars, containing about 110 pints each. The price current in the country is about seven or eight sols (fourpence) the French pint. Of the numerous kinds of wine made in Syria, the chief is the Vino d'Oro, or "golden wine" of mount Lebanon. This is not boiled, as is the case in the preparation of other wines, but left to purify itself by keeping; the quantity produced is small. It is, as its name implies, of a bright golden colour, and is highly prized even on the spot. Several considerable rivers have their source in this mountain, viz. the Jordan, Rocham, Nahar-Rossian, and Nahar-Cadicha; besides many lesser streams, that run between the valleys; particularly that of Ahoval, which flows down into the "Romantic valley," so called, because it is surrounded on all sides with high rocks. These rivers, rushing down from such heights, form several beautiful cascades, like those of the Nile. This mountain has been, and is still to this day, a place of retreat and refuge for a great number of robbers, and other desperate people. The stone which composes the mountains of Lebanon and Antilebanon, and those of Syria in general, is a hard calcareous stone of a whitish colour, sonorous like free-stone, and disposed in strata variously inclined. Of this stone the inhabitants build their houses, and make lime.

LEBANON, a post-town of America, in York county, Maine, on the east side of Salmon-Fall river; 100 miles N. of Bolton. It was incorporated in 1767, and in 1790 contained 1275 inhabitants.—Also, a post-town in Windham county, Connecticut, settled in 1697. The soil is equal to almost any in the state, and the inhabitants are generally farmers, of whom many are rich. The number of inhabitants is 3652; 9 miles N. of Norwich.—Also, a post-town in Grafton county, New Hampshire, on Muscourey river, and on the east side of Connecticut, 2 miles below Dartmouth college; incorporated in 1761, and in the year 1800, containing 1574 inhabitants.—Also, a post-town of Pennsylvania, situated on the fourth side of Quatapehilla creek, in Dauphin county; containing about 300 houses regularly built.

built, many of them of brick and stone, a German Lutheran and a Calvinist church; 82 miles N.W. by W. from Philadelphia.

LEBANON, *New*, a village in Canaan, New York, pleasantly situated, partly on the declivity of a hill, and partly in a vale, and containing medicinal springs next in celebrity to those of Ball-town, Saratoga.

LEBE, a town of Germany, in the lordship of Lauenburg, in a lake near the Baltic; 15 miles N.W. of Lauenburg. N. lat. 54° 40'. E. long. 17° 20'.

LEBEDIAU, a town of Russia, in the government of Tambov; 100 miles W.N.W. of Tambov. N. lat. 53° 28'. E. long. 38° 50'.

LEBEDIN, a town of Russia, in the government of Charkov; 60 miles N.W. of Charkov.

LEBEDOS, in *Ancient Geography*, a town of the Ionians, situated in Lydia, upon an isthmus, north of Colophon, distant 120 stadia from this city. Lyfimaachus demolished it, and transported the inhabitants to Ephesus.

LEBERIS, in some *Medical Writers*, a word used to express the exuvia of serpents, or the skins which snakes cast off every year. These are by some greatly recommended for taking off freckles and sun-burns from the face.

LEBIALNA, in *Geography*, an island of Russia, in the Caspian sea. N. lat. 45° 55'. E. long. 53° 30'.

LEBIAR, a forest of Africa, in the country of Zehaga, affording great quantities of gum; 100 miles E.N.E. of Portendie.

LEBIDA, or LEBDA, a sea-port town of Africa, in the country of Tripoli, on the coast of the Mediterranean; 30 miles E.S.E. of Tripoli. N. lat. 32° 40'. E. long. 13° 56'.

LEBIEDA, a town of Lithuania, in the palatinate of Wilna; 10 miles S. of Lida.

LEBIEDZLOW, a town of Lithuania, in the palatinate of Wilna; 56 miles E.S.E. of Wilna.

LEBLANC, MICHAEL, in *Biography*, born at Dijon in the year 1653, entered into the order of the Jesuits, and was one of the fourteen mathematicians whom Lewis XIV. sent to the king of Siam in 1687. Leblanc went and resided with the priests of the country, to learn their language; but the revolution taking place, which deprived the king of his crown, put an end to the hopes of the missionaries, and he was obliged to return to Paris. He had the misfortune of being taken prisoner by the Dutch, and thrown into prison at Middleburg, in Zealand. In the year 1690 he was set at liberty, and returned to Dijon, where he was employed as professor of mathematics in the Jesuits' college. In 1691 he joined a new mission for China, and embarked at Lisbon. During the voyage he met with an accident, which put an end to his life at Mozambique, in the year 1693. As a writer he is principally known by "A History of the Revolution of the Kingdom of Siam in 1688, and of the present State of the Indies," 2 vols. 12mo. Moreri.

LEBNA, in *Scripture Geography*, a strong city of Palestine, in the tribe of Judah, situated on a narrow neck of land, which ran northwards between the tribes of Dan and Benjamin. Joshua took it and gave it to the Levites of this tribe, and it became a city of refuge. This had been an encampment of the Israelites in the Desert.

LEBNEK, in *Geography*, a town of Transylvania; 15 miles S.E. of Scheburg.

LEBNI, in the *Matéria Medica of the Ancients*, a name given by some to storax. Avicenna has treated of this drug in three separate chapters. The Greeks were very nice in

distinguishing the several kinds of storax, and the Arabians seem to have followed their example: nay, they have even borrowed some of the terms, by which they called the particular sorts. The soft, or liquid storax of the Greeks, seems to have been very common among these people, and they have called it *mel lebn*, the honey of storax. This was a common word with them to express any thing soft.

LEBO, in *Geography*, a river of Chili, which runs into the Pacific ocean, S. lat. 37° 50'.

LEBRILIA, a town or village of Spain, in the province of Murcia, containing about 1000 inhabitants; almost divided into two by a fort of long, broad, and deep bog, formed by rains, over which is a bridge; 11 miles from Murcia.

LEBRIXA, or LEBRIJA, a town of Spain, in the territory of Seville, situated formerly on a branch of the Guadalquivir, but now, in consequence of its being choked up, 6 miles from the river. It has a castle; and the environs produce olives, which afford some of the best oil in Spain; 20 miles S. of Seville.

LEBSKOI, a town of Russia, in the government of Archangel, near the union of the rivers Mezen and Pezna; 168 miles E. of Archangel.

LEBUS, a town of the Middle Mark of Brandenburg, situated on the Oder, containing about 14,000 inhabitants. Its site is low, and among hills, which intercept the view of it; 5 miles N.W. of Franckfort on the Oder. N. lat. 52° 26'. E. long. 14° 44'.

LECA, a town of the island of Samos.

LECANOMANTIA, Λεκανομαντία, in *Antiquity*, a kind of divination performed in a basin with wedges of gold or silver. See HYDROMANCY.

LECASELLO, in *Geography*, a town of the Ligurian republic; 20 miles N.E. of Genoa.

LECCE, ALETUM, a city of Naples, the capital of the province of Otranto, and sometimes giving name to the province. It is a large, well-built town, the see of a bishop, suffragan of Otranto. The wool produced in its environs was formerly much celebrated; and the adjacent country yields abundance of almonds and olives. It contains, besides the cathedral, three parish churches and several convents. It is the residence of the governor, and the number of inhabitants is estimated by some at 13,000, by others at 18,000; 24 miles from Brindisi, and as far from Otranto, and 8 miles from the eastern shore. N. lat. 40° 40'. E. long. 18° 8'.

LECCI, a town of the island of Corlica; 5 miles N. of Porto Vecchio.

LECCO, a town of Italy, and capital of the department of the Montagna, on the lake Como, whence a branch of the lake is called "the lake of Lecco; 14 miles E.N.E. of Como. N. lat. 45° 5'. E. long. 9° 23'.

LECETA, a town of Spain, in Navarre; 17 miles N.N.W. of Pamplona.

LECH, in *Metalurgy*, a term used by the miners to express the gold ore which has been powdered and washed, and afterwards run with the assistance of lime-stone. The lech is afterwards burnt in a fire of charcoal, in order to render it fit for the separation of the metal, by means of lead, which absorbing and scorifying the extraneous matter, renders the gold pure.

LECHEUM, in *Ancient Geography*, a town and promontory of Greece, on the gulf of Corinth, which served as a port to Corinth. It had a temple of Neptune, in which was a bronze statue of this deity. Venus had also a temple here.

LECHEA, in *Botany*, was so named by Linnæus, at the suggestion of Kalm, in honour of Professor John Leche, of Åbo in Finland. Member of the Stockholm Academy, several of whose memoirs, relating to zoology, botany, and rural economy, are found in the Transactions of that learned body. He has also left us three dissertations, published under his presidency: 1, *Primitia Flora Scandinavica*; 2, *Novæ Insectorum Species*, written by his pupil Udman, a piece highly valued for its merit and rarity; 3, *De Commoratione hybernali et peregrinationibus birundinum*. He died in 1764, aged 60. The name is pronounced *Lékéa*. Linn. Gen. 43. Schreb. 59. Willd. Sp. Pl. v. 1. 495. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 185. Juss. 303. Lamarck. Illust. t. 52. Gært. t. 129. Michaux Boreali-Amer. v. 1. 76.—Clafs and order, *Triandria Trigynia*. Nat. Ord. *Caryophyllis*, Linn. Juss.

Gen. Ch. *Cal.* Perianth inferior, of three ovate, concave, spreading, permanent leaves. *Cor.* Petals three, oblong, narrower than the calyx, but about as long, concave. *Stam.* Filaments three, sometimes four or five, capillary, longer than the petals, lying over the pistil, equal; anthers roundish. *Pist.* Germen superior, ovate; styles none; stigmas three, feathery, spreading. *Peric.* Capsule ovate, slightly triangular, of three cells, and three valves, cohering at their base, with three central linear receptacles. *Seeds* solitary, ovate, angular at the inner side, where they are attached to each receptacle.

Ess. Ch. *Calyx* of three leaves. *Petals* three, oblong. *Capsule* superior, of three cells, and three half-distinct valves, with three central linear receptacles. *Seeds* solitary.

1. *L. minor*. Lesser Lechea. Linn. Sp. Pl. 133. Am. Acad. v. 3. 10. Lamarck. t. 52. f. 1? (*L. major*; Michaux n. 1, by the description.)—Hairs of the stem and branches spreading. Lower leaves whorled, elliptical, with a small point; upper alternate, lanceolate, acute. Flowers panicled, somewhat corymbose.—Gathered by Kalm in the dry sandy fir woods of Canada.—The root is perennial and woody. *Stems* several; the barren ones about a span long, lax, and spreading, with numerous, ternate or quaternate, short, leafy branches, all clothed with long, white, spreading hairs; flowering stems much taller and stouter, from one to two or three feet high, panicled, leafy, round, clothed with rather less spreading hairs. *Leaves* of the barren stems three or four in a whorl, on short stalks, spreading, a quarter of an inch long, broadly elliptical, entire, with a short point, the margin and rib fringed with long white spreading hairs; those of the flowering ones scattered, longer, and narrower. *Flowers* numerous, small, terminating the lateral branches, in small corymbose clusters, whose stalks are hairy, and more or less furnished with lanceolate bractæes. *Calyx-leaves* broad, keeled, very concave, smooth. *Capsule* polished.

This is certainly what Linnæus originally intended for *Lechea minor*, though he afterwards confounded other still smaller species with it, and the name being opposed to his *major*, which is a nonentity, is unmeaning, if not false. Less inconvenience, however, must arise from retaining than from changing it, unless we were furnished with more ample and certain materials for new modelling the whole genus. Our aim here is to correct such errors as we can, for the use of those who may take up the subject hereafter.

2. *L. major*. Greater Lechea. Linn. Sp. Pl. 133. Am. Acad. v. 3. 11. t. 1. f. 4; copied in Lamarck, f. 2.—“Leaves ovato-lanceolate. Flowers lateral, scattered.”—Native of dry situations in Canada. Linnæus, in his manuscripts and Syst. Veg. quotes for this, *Menandra ramis alternis*, Gron. Virg. ed. 2. 20, that is, *An Camerarie species, foliis latoribus oblongis, subtus argenteis, caule rubro, capsula*

*ampla trilobulari* of Clayton, who found his plant, flowering in August, on sandy hills at point Comfort, in the country of Gloucester, Virginia. It is described as shrubby, with the aspect of *Cistus Helianthemum* or of *Vaccinium Oxyococcu*, two plants between which it is difficult to find any point of resemblance; the *leaves* alternate, oblong, and entire. *Corolla* none. *Stamens* four, as long as the calyx, the two uppermost springing from the same point of the receptacle, the two lateral ones opposite. *Style* none. *Stigma* hipid. The rest of the account accords with the generic character. It must be observed that when Clayton guesses his plant to belong to *Cameraria*, he means that of Dillenius, which is the Linnæan *Montia*. Linnæus, in the *Amœnitates*, describes his *L. major* thus. “*Stems* purplish, round, with simple, alternate, distant branches. *Leaves* alternate, oval-lanceolate, rough above, downy beneath, reflexed at the margin, scarce perceptibly stalked. *Flowers* two, three or four from the small uppermost branches.” Now it happens that the specimen in the Linnæan herbarium is no other than *Cistus canadensis*, with the numerous stamens proper to that genus, and totally foreign to *Lechea*. The capsule also has imperfect partitions from the middle of the valves. The *seeds* indeed appear to be but one in each cell, and large, the only circumstance which could induce a reference of this *Cistus* to *Lechea*. Yet there can be no doubt of the description in the *Amœnitates* having been made from this plant, though the figure is unlike it, and more resembles *L. minor*, for which indeed, as well as for the *major*, it is quoted by Linnæus in Sp. Pl. and being in itself too imperfect to convey a precise idea of any thing, it can determine nothing in the present case. What is *L. major* of Kalm we know not, nor that of Hort. Kew. That of Michaux appears clearly to be our *minor*, whose lower leaves are indeed so much like *Oxyococcus*, while its upper are not very unlike *Helianthemum*, that Clayton might possibly have that species in view when he made the above description, but the “large capsule with three cells” agrees best with the above *Cistus*. Amid all this uncertainty we would rather strike out *L. major*, and give a new name, perhaps *heterophylla*, to our *minor*.

3. *L. racemulosa*. Many-clustered Lechea. Michaux Boreali-Amer. v. 1. 77. (Menandra ramis ternis; Gron. Virg. ed. 2. 21.)—Hairs close-pressed. Leaves linear-lanceolate, acute, hairy beneath. Flowers in numerous slender clusters. *Calyx* hairy.—Gathered by Clayton in the same place, at point Comfort, with the last. Specimens from him are in the Linnæan herbarium, answering to the account of Michaux, who also gathered his plant in Virginia. We have others, probably of the same species, from Kalm, and from the Rev. Dr. Muhlenberg of Lancaster in Pennsylvania. Those of Clayton have a panicled stem, a foot or two high, clothed with close-pressed, somewhat silky, hairs; the branches either ternate, opposite, or feathered. *Leaves* of the stem lanceolate; those of the branches linear, gradually smaller upwards, and often accompanying the *flowers*, but sometimes the *clusters* are leafless; they are elongated, slender, hairy or silky. *The calyx* also is hairy, and greatly resembles that of a little annual *Cistus*.

4. *L. thymifolia*. Thyme-leaved Lechea. Michaux Boreali-Amer. v. 1. 77, excluding the synonym. (*Capraria foliis integerrimis*; Gron. Virg. ed. 1. 75. Herb. Linn. from the author.)—Hairs close-pressed. Leaves lanceolate. Stem panicled. *Clusters* leafy. *Bractæes* linear, much longer than the flowers.—Gathered by Clayton in Virginia; by Michaux in dry exposed situations in North and South Carolina. *Stem* a foot high, round, reddish, rough with close-pressed hairs; simple and naked below; panicled and leafy above. *Leaves* opposite or scattered, various in size, slightly

slightly stalked, lanceolate, acute, the margin and rib fringed. *Flowers* in numerous, slender, hispid clusters, furnished with copious linear *bractææ*, two of which, extremely narrow and obtuse, accompany every flower at the base, and are twice as long as the *calyx*; which is likewise hairy or hispid.

5. *L. tenuifolia*. Slender-leaved Lechea: Michaux Bo-reali-Amer. v. 1. 77.—Stems bushy, decumbent, ascending, with spreading branches. Leaves linear-awl-shaped. Flowers ranged alternately, and rather remotely, along the branches. On sandy hills near the Santee river, flowering in April and May. We know nothing of this species but from Michaux, who describes it as of humble and bulky growth, with *cap-sules* rather larger, in proportion to the plant, than is usual in this genus.

6. *L. verticillata*. Whorled Lechea. Willd. n. 3.—Leaves elliptical, ferrated. Flowers whorled.—Sent by Dr. Rotter from Madras. The root seems, as in all the former, to be perennial. *Stems* several, spreading or decumbent, simple or branched, a span long, round, leafy, clothed with soft spreading hairs. *Leaves* opposite, stalked, half an inch long, elliptical, acute, finely and sharply ferrated, hairy, tapering at the base. *Flowers* numerous, in dense axillary whorls, sufficiently agreeing with the character of the genus, to which Willdenow has judiciously referred it. The ferrated *leaves*, however, are very peculiar.

Another species, *L. chinensis*, is mentioned in Loureiro, Cochinch. 60; but this, though adopted by professor Mar-tyr, cannot, in our opinion, have any right to a place here, the author's description shewing it evidently to be nearly allied to *Commelina*, consequently more remote, if possible, than even the above *Cissus canadensis* from *Lechea*. S.

LECHENAULTIA, named by Mr. R. Brown, in compliment to his friend Lechenault, an eminent French botanist and traveller, who has undertaken to illustrate the plants of the western coast of New Holland more especially, as well as those of Java and Timor. Brown Prodr. Nov. Holl. v. 1. 581. Class and order, *Pentandria Mono-gynia*. Nat. Ord. *Campanaceæ*, Linn. *Campanulaceæ*, Juss. *Goodenovicæ*, Brown.

Efl. Ch. Calyx superior. Tube of the corolla slit longitudinally on one side. Anthers coloring. Pollen of compound grains. Stigma obsolete, in the bottom of a two-lipped cover. Capsule prismatic, of two cells, and four opposite valves with central partitions. Seeds cubical or cylindrical, shelly. *Brown*.

Obs. The grains of pollen, in all the species, are composed of four combined globules, which mark, though minute, is esteemed by Mr. Brown very essential to distinguish this genus from all the rest of its natural order, and especially from its near ally *Anthotium*.

The species are generally shrubs of humble growth, rarely herbaceous, and are smooth, with narrow entire leaves. *Flowers* axillary or terminal, mostly solitary.

*Stk. 1.* Small shrubs, with heath-like leaves. *Flowers* axillary or terminal. Capsule valvular. Seeds cubical.

1. *L. formosa*. *Flowers* axillary, solitary, drooping, without *bractææ*. Corolla smooth, two-lipped.—Gathered by Mr. Brown on the south coast of New Holland.

2. *L. tubiflora*. *Flowers* nearly terminal, solitary, slightly stalked. Corolla tubular, curved, with a closed limb. Leaves awl-shaped, with a small pellicid point.—Native of the same country.

3. *L. expansa*. Corymbs axillary, of few flowers. Stalks with a pair of *bractææ* each. Corolla with one lip, in fringed segments.—Native of the same country.

*Stk. 2.* Herbaceous. Flower opposite to a leaf. Cap-

sule opening only when far advanced, its valves cohering by a narrow neck. Seeds cylindrical.

4. *L. filiformis*. Leaves alternate, thread-shaped, somewhat compressed.—Gathered by Mr. Brown in the tropical part of New Holland.

LECHERAINE, in *Geography*, a town of France, in the department of Mont Blanc; 10 miles N.N.E. of Cham-bery.

LECHIA, in *Ichthyology*, a name given by Paulus Jovius, and others, to the fish called by others *amia* and *glaucus*, and by the ancient Greeks *amia* and *troctus*. See SCOM-BER.

LECHLÄDE, or LEACHLADE, in *Geography*, a small market-town and parish in the hundred of Brightwells-bar-row, Gloucestershire, England, is situated, 76 miles distant from London, on the north side of the river Isis, or Thames, near the point where the counties of Berks, Oxford, and Gloucester unite; and not far from the place where the Leche rivulet empties itself into the Thames. From the latter circumstance Lechlade is said to have derived its name: *lade* being a contraction from the Saxon *ladean*, to unload or empty. In Domesday book is the mention of a fishery here of 175 eels. The manor, at the period of that survey, was the property of Henry de Ferrers, ancestor of the Ferrers, earls of Derby, from whom, by the marriage of Isabel, an heiress, it was conveyed to Roger Mortimer. A priory, or hospital for Black Canons, and consisting of a master and certain poor and infirm brethren, was founded here upon a piece of ground called Lade, near the ancient bridge over the Thames, given for that purpose by lady Isabel Ferrers. The hospital was suppressed in the year 1473, and its revenues applied to the foundation of a chantry of three priests in the parish church. Some foundations of buildings, supposed to have belonged to the priory, have been dug up near the bridge. The church is a handsome structure in the pointed style, and was erected, about the middle of the fifteenth century, at the joint expence of the then vicar, Conrad Ney, the inmates of the priory, and the inhabitants of the parish. The nave is spacious, and divided from the aisles by light pillars; at the west end is a square embattled tower, terminated by a well-proportioned spire: the pulpit is of sculptured stone. At this town the Thames becomes navigable; and here the junction of the Thames and Severn is completed by the canal. Moll of the Wilt-shire and Gloucestershire cheefe, consumed in the metropolis, is brought in waggons to this town, where it is put on board the vessels which convey it down the Thames. A weekly market is held on Tuesdays, for which the grant was obtained by Richard, earl of Cornwall: an annual fair, held on the ninth of September, is much frequented. According to the returns made in 1800, under the population act, the inhabitants of this parish amounted to 917; the number of houses to 193.

In a meadow near Lechlade, was lately discovered a large subterraneous building, supposed to have been a Roman bath: it was nearly fifty feet in length, forty in breadth, and four in height; the floor was supported by pillars of brick, and curiously inlaid with stones of variegated colours. Ridge's History, &c. of Gloucestershire, 2 vols. 8vo. Beauties of England and Wales.

LECHNICH, a town of France, in the department of the Roer, and chief place of a canton, in the district of Cologne. The place contains 1053, and the canton 11,462 inhabitants, in 31 communes.

LECHONES, Os, a cluster of small islands in the At-lantic, near the W. coast of Portugal; three miles N. from the

the mouth of the Duero. N. lat. 41° 43'. E. long. 8° 25'.

**LECHWAR**, a town of Hindoostan, in Bahar; 30 miles S. of Bahar.

**LECK**, a town of Denmark, in the duchy of Sleswick; 14 miles N. of Bredtede.

**LECKNESS**, a town of Norway; 22 miles W. of Christianfand.

**LE CLERC, DANIEL**, in *Biography*. See **CLERK**, DANIEL LE.

**L'ECLUSE**, in *Geography*. See **ECLUSE**.

**LE COQ, ANTHONY**, in *Biography*, a Parisian physician, graduated in the faculty of that city, and practised there with great reputation until his death, which took place on the 28th of March, 1550. He was elected dean of his faculty in 1538; and in the following year was called, in consultation with Fernel, to visit the French king, Francis I. who had contracted the venereal disease. He shewed his knowledge of the nature of the disease, by insisting, in opposition to Fernel, who was not disposed to employ any other remedy than his antivenerol opiate, that mercurial frictions were necessary; but his mode of proposing it evinced that he was a novice in the manners of a court. He observed to Fernel, speaking of the king, "C'est un vilain qui a gagné la vérole; frottetur comme un autre, et comme le dernier de son royaume, puisque il s'est gâté de la même manière." This was reported to the king, who laughed, and was pleased with his frankness. **Le Coq** left two works: 1. "De Ligno sacro non permiscendo in imperitos fucatoque medicos," Paris, 1548. 2. "Confilia de Arthritide," Francfort, 1540. The latter comprehended also some other treatises on the gout, especially those of Sylvius and Fernel; in conjunction with whom, **Le Coq** had been consulted on the subject by Louis of Flanders, and by Eleonora, queen of France. Eloy. Dict. Hist.

**LECTICA**, among the Romans, a litter, or vehicle, in which people were carried. The *sellæ* differed from the *lectica*, as being higher, and because people always sat in it; on which account the *sellæ*, from the time it was first brought into use, was esteemed the more honourable carriage of the two. See **LITTER**.

The *lectica* was also used as a bier for carrying out the dead, who were dressed in habits suitable to their quality and sex. Pitif. in voc. See **BURYING**.

**LECTICARII**, among the Romans, servants who carried the *lectica*.

**LECTICARIUS**, was also an officer in the Greek church, whose business it was to bear off the bodies of those who died, and to bury them. These were otherwise denominated *decani* and *copiate*.

**LECTIO, READING**. Considered in a medicinal view, it is said by Celsus, lib. i. cap. 4. to be bad, especially after supper, for those whose heads are weak: and in lib. i. cap. 8. he recommends reading with an audible voice, for such as have weak stomachs. It is also directed by Paulus Æginetus as an exercise, lib. i. cap. 19.

**LECTISTERNIUM**, a religious ceremony among the ancient Romans; being a festival prepared, and solemnly served up, in a temple, at a time of public calamity and danger.

And because, according to the customs of those times, they placed beds around the tables, and set the statues of the gods on those beds, in the same manner as men sat at meals, they called the solemnity *lectisternium*, from *lectus*, bed, and *sternere*, of *sterno*, to spread, prepare.

In this ceremony the Sibylline decemvirs presided, till

the year of Rome 558, and afterwards the Epulones. See **EPULO**.

Casaubon has observed, from a passage in the scholiast of Pindar, that the Greeks had also a sort of *lectisternium* in use.

Livy observes, that the first *lectisternium* seen in Rome, was that which held for eight days successively, in honour of Apollo, Latona, Diana, Hercules, Mercury, and Neptune; on occasion of a contagious disease which killed almost all their cattle, in the year of Rome 354; though Valerius Maximus mentions one before that.

**LECTORES**, among the Romans, servants in great men's houses, who were employed in reading while their masters were at supper. They were called by the Greeks *anagnostæ*.

**LECTOURE**, in *Geography*, a town of France, and principal place of a district, in the department of the Gers, seated on a mountain, having access only on one side, near the Gers, and well defended. Before the revolution it was the residence of a governor, and see of a bishop. The place contains 5433, and the canton 13,655 inhabitants, on a territory of 265 kilometres, in 17 communes; 16 miles S. of Agen. N. lat. 45° 56'. E. long. 0° 22'.

**LECTUM**, in *Ancient Geography*, *Cape Baba*, a promontory of Asia Minor, belonging to the Troades, situated between the isle of Lesbos to the south, and that of Tenedos to the north, at the extremity of Mount Ida. To the north it terminated the gulf of Adramyctium.

**LECTURERS**, in England, are an order of preachers in parish churches, distinct from the rector, vicar, and curate. They are chosen by the vestry, or chief inhabitants of the parish, supported by voluntary subscriptions and legacies, and are usually the afternoon preachers in the Sunday service. The term is also more generally applied to those who preach on Sunday, or on any stated day of the week, in churches, or other places of public worship. By 13 & 14 Car. II. cap. 4. lecturers in churches, unlicensed, and not conforming to the liturgy, shall be disabled to preach, and shall also suffer three months' imprisonment in the common gaol: and two justices, or the mayor, or other chief magistrate, in a town corporate, shall, upon certificate of the offence from the ordinary, commit them accordingly. Where there are lectures founded by the donations of pious persons, the lecturers are appointed by the founders, without any interposition or consent of rectors of churches, &c. though with the leave and approbation of the bishop: such as that of lady Moyer's at St. Paul's. But the lecturer is not entitled to the pulpit, without the consent of the rector or vicar, who is possessed of the freehold of the church.

**LECTURES**. See **BOYLE'S Lectures**.

**LECTURES of Divinity**, &c. in the universities. See **REGIUS Professors**.

**LECTUS IGNEUS**, among the Romans, a kind of instrument of torture first invented by Decius. The bottom of it was set with serrated teeth or spikes, and strewed with salt; while melted tallow was poured from above on the unhappy tortured person.

**LECTYTHIS**, in *Botany, so denominated by Læffing, from the Greek word *λεκτυς*; an oil jar, or large pot. He confounds it with *λεκτος*, the yolk of an egg. The latter has been used for the pea, alluding to the yellow colour of its internal substance: *λεκτος* applies to the form of the seed-vessel, which is that of a great pot with a cover. Læff. It. 189. Linn. Gen. 268. Schreb. 359. Willd. Sp. Pl. v. 2. 1172. Mart. Mill. Dict. v. 3. Jacq. Amer. 168.*

## LECYTHIS.

Juss. 327. Lamarck Illustr. t. 476.—Class and order, *Polyandria Monogynia*. Nat. Ord. *Hesperideae*, Linn. *Myrii*, Juss.

Gen. Ch. *Cal.* Perianth superior, of six roundish, concave, permanent leaves. *Cor.* Petals six, very large, oblong, obtuse, flat, the two uppermost widely spreading. Nectary petal-like, of a single tongue-shaped leaf, flat and perforated at the base to admit the germen, bordered; its oblong part bent inwards and upwards from the bottom of the flower, linear, externally convex, thicker and ovate at the extremity, covering the pistil with the filaments. *Stam.* Filaments very numerous, inserted upon the disk of the base of the nectary at the inner side, very short, swelling upwards; anthers oblong, small. *Pist.* Germen inferior, depressed, pointed, encompassed with the receptacle of the flower, style very short; stigma bluntish, conical. *Peric.* Capsule woody, roundish at the base, abrupt at the top, encompassed with the remains of the calyx, cut round, and opening by a circular lid, imperfectly divided into four, sometimes two or six cells. *Seeds* few, polished, with rough edges.

Eff. Ch. Petals fix. Calyx of fix leaves. Nectary tongue-shaped, bearing the filaments. Capsule with a lid, and many seeds.

1. *L. ollaria*. Linn. Sp. Pl. 734. Loeffl. It. 189. (Jacapucaya; Marcgr. Bras. 128. Pfl. Bras. 135.)—Leaves sessile, ovate, somewhat heart-shaped, nearly entire.—Native of Brazil and the Caracacs. This, according to Laëfling, is a *vault tree*, with large unequal branches, bent in various directions, and a rough bark. *Leaves* about the ends of the branches, alternate, sessile, ovate inclining to heart-shaped, firm, smooth, nearly entire, slightly waved, of a brownish green. *Flowers* in terminal clusters, slightly drooping, on alternate, horizontal, somewhat angular stalks, with ovate, concave, soon deciduous bractees. *Corolla* white, with a yellow nectary.—Marcgraave says the *leaves* are serrated, the *fruit* like a pot with its cover, as big as a child's head, containing seeds like chestnuts, eatable either raw or roasted, and that the bark of the tree serves to make ink.

2. *L. minor*. Linn. Syst. Veg. ed. 14. 494. Jacq. Amer. 168. t. 109.—Leaves stalked, lanceolate, serrated.—Observed by Jacquin in woods near Carthagen, South America, flowering in June and July, ripening fruit in December. An elegant branching tree, 60 feet high. *Leaves* numerous, six inches long, alternate, spreading in two directions, lanceolate-oblong, pointed, serrated, smooth. *Spikes* terminal, each often accompanied by a smaller axillary one below, shorter than the leaves; the *flowers* nearly sessile, slightly feented. *Petals* and *nectary* white. *Stamens* yellow. *Fruit* very hard, brown, two inches wide. *Seeds* about eight. Jacquin thought he experienced a giddiness and sickness after eating one of them, though its taste proved very agreeable. Some persons told him these seeds were eatable, others reported them to be poisonous. Monkeys are said to be fond of them. The flowers are infested with a kind of black wasps, very troublesome to those who attempt to gather any.

3. *L. grandiflora*. Aubl. Guian. v. 2. 712. t. 283—285. (*L. Ollaria*; Linn. Am. Acad. v. 8. 258; Herb. Linn.)—Leaves stalked, obovate, entire. Clusters many times longer than the footstalks. Petals obtuse.—Native of Guiana and Surinam. A large tree. *Leaves* from four to seven inches in length, and two or three broad, obovate-oblong, with a little point, entire, slightly wavy, smooth, with one rib and many parallel transverse veins. *Footstalks* an inch long. *Clusters* about the ends of the branches, axillary, pendulous,

of numerous large rose-coloured flowers, whose partial stalks are an inch long, bearing a pair of blunt bractees, and whose blunt concave petals are nearly an inch and half in length. *Calyx-leaves* rounded, obtuse, flat. *Fruit* about seven inches long, and four wide; the opening about 2½. *Seeds*, according to Aublet, very good to eat: The flowers appear in January, the fruit is ripe in April.

4. *L. amara*. Aubl. Guian. 716. t. 286 and 285.—Leaves elliptic-oblong, pointed, entire. Clusters axillary and terminal, twice the length of the footstalks. Petals acute.—Found in the woods of Guiana, by Aublet, whose figure and description afford all the knowledge we have of this species. He says the *trunk* is 10 feet high, bearing at the top many straight and horizontal branches, whose subdivisions are pendulous and leafy. In his French description, which will generally be found the most original and authentic throughout his work, he says this is a very lofty tree. The flowers are small, yellow, with two or three scales upon their footstalks. *Fruit* the size of an egg, its coat thin though hard. *Seeds* bitter, but eaten by monkeys.

5. *L. Zalucajo*. Aubl. Guian. 718. t. 288.—Leaves elliptic-oblong, pointed, entire. Clusters terminal. Petals obtuse. Calyx-leaves lanceolate.—Gathered by Aublet in the desert woods of the interior of Guiana, flowering in March, and bearing fruit in July. We have from sir Joseph Banks a specimen of this species, gathered in Dutch Guiana by Mr. Alexander Anderson, which agrees well with Aublet's description, and helps us better to understand the distinctive characters, than professor Willdenow was able to do from his incorrect figure. The professor rightly expunges the quotations of Piso, which belong to the first; but it is unlucky that the specific name belongs to them, or rather perhaps is common to many species. This is a *vault tree*; its *trunk* 60 feet, or more, in height. *Wood* white, red in the centre. *Leaves* stalked, from six to ten inches long, and two or more in breadth. *Clusters* at the ends of the branches, pendulous. *Partial flower-stalks* an inch long, swelling upward. *Calyx-leaves* broadish at the base, tapering, concave, sharpish from the inflexion of their edges at the summit, fleshy, one-third of an inch in length, reddish when fresh. *Petals* large, rounded, fleshy, white bordered with rose-colour, two of them much bigger than the rest, being equal to those of *L. grandiflora*. The *fruit* is about four inches in diameter. *Seeds* sweet, eatable, preferable to our almonds.

6. *L. Idaitimon*. Aubl. Guian. 721. t. 289.—Leaves elliptical, pointed, entire. Clusters axillary. Stalks glandular. Calyx-leaves ovate, acute. Petals obtuse.—Native of wild forests in Guiana. A tree agreeing with the last in height, and in the general aspect of its leaves. *Clusters* axillary, with zigzag, glandular red stalks. *Flowers* rose-coloured, not half the size of the last, with broader calyx-leaves. *Fruit* little more than an inch in diameter. Aublet observed what he deemed a variety only, with yellow flowers.

7. *L. parviflora*. Aubl. Guian. 717. t. 287 and 285.—Leaves elliptic-oblong, pointed, entire. Clusters terminal, panicled. Petals acute. Capsule of two cells.—Found about the banks of rivers in Guiana. *Aublet*. A small tree, with drooping branches. *Leaves* three or four inches long. *Flowers* much smaller than even those of *L. amara*, bright yellow, and very fragrant. *Fruit* small, thin and brittle, of only two cells. *Seeds* solitary, bitter.

8. *L. multiflora*.—Leaves . . . Clusters terminal, panicled. Petals obtuse. Calyx-leaves broader than long, rounded, blunt, downy.—A native of Guiana, communicated by E. Rudge, esq. as a new species of *Lecythis*, which

which it really appears to be. The *leaves* are wanting in our specimen. *Clusters* plentifully terminating the little branches at the ends of the main ones, bearing many *flowers*, which are of a moderate size, and seem to be yellow, their petals rounded and blunt. The partial *stalks* are an inch long, swelling upwards, downy or glandular, naked. *Germs* hemispherical, downy, crowned with the six calyx-leaves, which are very short, rounded or heart-shaped, blunt, minutely fringed, very like those of a *Myrtus* or *Eugenia*.

9. *L. bracteata*. Willd. n. S. (Couroupita guianensis; Aubl. Guian. 708. t. 282. *Pekia fructu maximo globofo*; Barrere France Equinoxiale, 92.)—Leaves thick, obovate, pointed, entire. *Clusters* lateral. *Calyx* with a pair of acute bractæas at its base. *Fruit* of six cells.—Native of Cayenne, where the fruit is known by the name of the *cannon ball*. This is a large tree, with a thick rugged bark, and white soft and indifferent wood, red in the middle. The shape of the *leaves* seems most to approach those of *L. grandiflora*, and these two species agree also in having a pair of bractæas on each partial stalk, just below the calyx. These are acute in the present, blunt in the former. Both also have a deciduous bractæa at the base of each partial stalk. All this confirms the propriety of reducing them to one genus, though the *fruit* of that now under consideration has six cells, and its coats are separated by an intermediate pulpy and fibrous substance, which may also be the cause of its lid not falling off, as in all the above-described. *L. bracteata* is in flower and fruit nearly all the year round. Its *corolla* is of a full rose-colour, beautiful and fragrant. The *fruit* is as large as a cannon ball of 36 pounds, and Aublet remarks that its weight is such as to render it dangerous in falling. The pulp is red, acid, and not disagreeable, diffused, as the fruit ripens, through all the internal part, among the seeds.

LECYTHUS, in *Ancient Geography*, a town of Greece, in Eubœa. Thucydides.

LEZENZA, in *Geography*, a river of Africa, which runs into the Mozambique gulf, S. lat. 17° 20'.

LECZNA, a town of Poland, in the palatinate of Chelm; 24 miles N.W. of Chelm.

LEDA NEGUS, a town of Abyssinia, in the province of Gojam; 120 miles S.S.W. of Gondar.

LEDAH, a town of Hindoostan, in the circar of Gangpou; 20 miles S. of Gangpou.

LEDBURY, an ancient borough, and market town in the hundred of Radlow, and county of Hereford, England, is situated on a declivity within a small valley, formed by the Dog-hill and other eminences, about one mile west from the river Leddon, from which it derives part of its name. The town consists chiefly of two streets, crossing each other at right angles; the principal street runs north and south, and has a middle row near the old market house. This building is elevated on strong oak pillars, and composed of timber and lath plastered and white-washed; the beams being coloured black. This mode of building is prevalent in the more ancient parts of the town; and many of the houses have projecting stories: the modern houses are of red brick, and of a respectable appearance. The pavement, even in the high street, is very bad, and full of inequalities; the small stones that form it being pressed into the stiff clay, which is the general soil of the county. Ledbury formerly belonged to the see of Hereford; and bishop Bohun procured the charter of a market from king Stephen, to be held on Saturdays; but this having fallen into disuse, queen Elizabeth granted a new charter for a Tuesday market, and two annual fairs; the tolls arising from which were to be given to the poor. This borough had once the privilege of

sending two members to parliament, but surrendered the right, on the plea of inability to support them. The church, which is a large edifice, of Saxon origin, consists of a nave, side aisles, and chancel; a chapel called St. Catherine's, and a detached tower, terminated by a finely proportioned spire, about sixty feet high. Bishop Foliot founded an hospital in this town in the year 1232 for the maintenance of poor men and widows: it was refounded and further endowed by queen Elizabeth. The hospital is a very ancient timber and plaster building. Here are also a free-school, a charity-school, and several almshouses. The clothing trade was, at one period, very flourishing in this town; but the principal business now carried on is the manufacture of ropes, lines, and facks. The cyder trade is very considerable; great quantities being made in the vicinity. Ledbury is distant from London 121 miles; the inhabitants, as ascertained under the act of 1800, amounted to 3058; the number of houses being 618. The bishops of Hereford formerly had a palace here.

On the Dog-hill, to the north of Ledbury, is Hope End, the seat of sir Harry Vane Tempest, bart. About two miles south of the town is the Vineyard camp; the works of which have been almost defaced by the plough, and the area is cultivated. Beauties of England.

LEDER, a lake of the county of Tyrol; 18 miles W. of Trent.

LEDESMA, an ancient town of Spain, formerly called *Bletija*, in the province of Leon, situated four or five leagues from the mouth of the Tornices, and defended both by nature and art. In its jurisdiction are 380 villages, which have about 16,000 houses. To the E. of Ledesma and near it is a medicinal bath, made by a Moor for the use of the public. The water is moderately warm, and is reckoned good for the cure of different diseases, particularly the itch; 18 miles W. of Salamanca.

LEDETSCH, a town of Bohemia, in the circle of Czaflau; 13 miles S. of Czaflau. N. lat. 49° 40'. E. long. 15° 15'.

LEDETZ, a town of Bohemia, in the circle of Bolef-law; seven miles S.E. of Jung-Buntzel.

LEDGER. See BOOK and BOOK-KEEPING.

LEDGERS, among Builders. See PUTLOGS.

LEDGES, in a Ship, oak or fir scantling, used in framing the decks, which are let in the carlings athwart the ship. Those for gratings arch upwards, agreeable to the head ledges, which form the hatchways, &c.

LEDIANAIA, in *Geography*, a bay or gulf of the Frozen sea, on the coast of Nova Zembla. N. lat. 76° 40'. E. long. 59° 14'.

LEDIANOI, a cape on the N. coast of Nova Zembla. N. lat. 78°. E. long. 73° 24'.

LEDIGNAN, a town of France, in the department of the Gard, and chief place of a canton, in the district of Alais. The place contains 666, and the canton 3965 inhabitants, on a territory of 102½ kilometres, in 13 communes; 15 miles N.W. of Nîmes.

LEDON, in Gardning. See CISTUS.

LEDONG, in *Geography*, a town on the E. coast of the island of Borneo. N. lat. 4° 33'. E. long. 116° 42'.

LEDOREN, a small island on the W. side of the gulf of Bothnia. N. lat. 63° 12'. E. long. 20° 56'.

LEDOYRA, a town of Spain, in Galicia; 12 miles N.E. of Santiago.

LE DRAN, HENRY FRANCIS, in *Biography*, a celebrated surgeon of the 18th century, was a native of Paris, where his father practised the same profession with considerable reputation, and was deemed the first operator of his

time. He soon equalled his father in reputation; and uniting with great dexterity, an excellent judgment and much acuteness of mind, learning, and experience, he not only practised with great success, but was the author of several works, which gave him a high rank among the surgeons of France. These are, "Parallele des différentes manieres de tirer la pierre de la vessie," Paris, 1730. "Observations de Chirurgie, auxquelles on a joint plusieurs Reflexions en faveur des Etudiants," Paris 1731, two vols. 12mo. Both these works were translated into other languages, and passed through several editions. "Traité des Operations de Chirurgie," *ibid.* 1731, 8vo. This was also a valuable work, was translated into English, and several times reprinted. "Reflexions sur les plaies d'armes à feu," *ibid.* 1737, &c. 12mo. A short treatise, but full of judicious and interesting observations, the result of the author's practical observation during several campaigns, in which he accompanied the French armies. "Suite du parallele de la taille," *ibid.* 1756, 8vo. "Consultations sur la plupart des maladies qui font du ressort de la Chirurgie," *ibid.* 1765; another judicious and valuable work, which contributed to support the eminent character of the author. But his last work, "Traité économique de l'Anatomie du corps humain," *ibid.* 1768, was inferior to the rest, his genius seeming to partake of the debility which age had now occasioned in his frame. Eloy. Dict. Hist.

**LEDUM**, in *Botany*, a name adopted from the Greeks, whose *λεδω* is generally believed to be a species of *Cistus*. Linnæus, in applying it to designate a not very dissimilar genus of shrubs, whose scent is so powerful as to be unpleasant and hurtful, offers an etymology expressive of that circumstance, *a ledendo*; but such explanations have scarcely more than the merit of a pun, and none in this case was wanting. Linn. Gen. 218. Schreb. 294. Willd. Sp. Pl. v. 2. 602. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 48. Juss. 159. Lamarck Illustr. t. 363. Gært. t. 112. Clafs and order, *Decandria Monogynia*. Nat. Ord. *Bicornes*, Linn. *Rhododendrea*, Juss.

Gen. Ch. Cal. Perianth inferior, minute, of one leaf, with five teeth, permanent. Cor. of one petal, wheel-shaped, regular, in five deep, ovate, concave, rounded segments. Stam. Filaments ten, thread-shaped, spreading, as long as the corolla; anthers ovate-oblong, vertical, opening by two terminal pores. Pist. Germen superior, roundish; style thread-shaped, the length of the stamens; stigma obtuse. Peric. Capsule roundish-oblong, of five cells, and five valves, separating from the base, their inflexed margins forming the partitions. Seeds numerous, oblong, narrow, their extremities acute and very thin, attached to five linear pendulous receptacles, proceeding from the central column. Eff. Ch. Calyx five-cleft. Corolla flat, in five deep regular segments. Capsule of five cells, splitting from the base; and partitions from the margin of the valves.

1. *L. palustre*. Marsh Ledum. Linn. Sp. Pl. 561. Fl. Lapp. ed. 2. 127. Ehrh. Arb. 113. Fl. Dan. t. 1031. (L. silesiacum; Clus. Pann. 69. Hist. v. 1. 83. Ger. em. 1288. Rosmarinum sylvestre; Camer. Epit. 546.)—Leaves linear, revolute, woolly beneath.—Native of spongy bogs in the north of Europe, very plentiful in Lapland. With us it flowers in April and May, being cultivated in bog earth, like the shrubs of North America. The stem is shrubby, erect, much branched in a determinate manner, about two feet high; the young branches woolly. Leaves scattered, numerous, stalked, an inch or more in length, linear, obtuse, entire, revolute; dark green and smooth above; clothed with dense rusty wool beneath. Flowers numerous, in dense, simple, terminal, bracted corymbs,

white and very pretty. The whole plant, especially when bruised, has a strong aromatic oppressive scent, somewhat like hops, instead of which the inhabitants of Dalecarlia are said by Linnæus sometimes to make use of it, but the consequences are a most pernicious kind of intoxication, with obstinate head-aches. The Swedes wash their oxen and swine with a decoction of it, to kill lice, and the settlers in Lapland frew its branches among their grain to drive away mice.—A procumbent variety, a span long, is said to be found at Hudson's bay, just as the birch grows humble, and almost prostrate, in the upper parts of Lapland.

2. *L. latifolium*. Labrador Tea, or broad-leaved Ledum. Ait. Hort. Kew. ed. 1. v. 2. 65. Jacq. Ic. Rar. t. 464. (L. groenlandicum; Fl. Dan. t. 567.)—Leaves elliptical, revolute, woolly beneath. Stamens scarcely more than five.—Native of bogs in Greenland, Labrador, Newfoundland, &c. Differs from the last chiefly in the broad form of its leaves and the very conspicuous dense rusty wool of their under side. The stamens are usually from five to seven or eight, seldom ten.

3. *L. busifolium*. Box-leaved Ledum. Bergius in Act. Petrop. for 1777. part 1. 213. t. 3. f. 2. *Dryand*. Leaves elliptical, smooth on both sides, nearly flat. Native of Carolina and New Jersey. Introduced to our gardens by the celebrated Peter Collinson in 1736. It is a much smaller shrub than either of the foregoing, with leaves resembling those of *Azalea procumbens* at first sight. They are about  $\frac{1}{2}$  of an inch long, elliptical or obovate, smooth on both sides, most shining above, their edges scarcely revolute, their midrib prominent underneath. Flowers white, about a quarter of the size of the first species.

**LEDUM**, in *Gardening*, comprehends plants of the hardy evergreen kind, as the marsh chisil, or wild rosemary. The species cultivated is the marsh ledum, (*L. palustre*.)

It has varieties with erect and decumbent branches.

*Method of Culture*.—These plants are increased by sowing the seeds in pots filled with boggy earth, or in shady borders of the same kind of mould, in the spring season. But the best method is to take up the plants in their native situations, with balls of earth about their roots, and plant them in borders of the above kind, keeping them well watered.

It is also found that layers of the young shoots will sometimes grow.

These plants afford variety in shady situations, where the soil is of the boggy kind.

**LEDYARD**, in *Biography*, a native of America, who seems from his youth to have indulged an invincible desire of acquainting himself with the unknown, or imperfectly discovered regions of the globe. His history is so extraordinary, that a detail of some of its leading particulars cannot be unamusing to our readers. Having lived for several years with the Indians of America, he had studied their manners, and had practised in their school the means of obtaining the protection, and of recommending himself to the favour of savages. In the humble situation of a corporal of marines, to which he submitted rather than relinquish his pursuit, he had made with captain Cook the voyage of the world; and feeling on his return an anxious desire of penetrating from the north-western coast of America, which Cook had partly explored, to the eastern coast, with which he himself was perfectly familiar, he determined to traverse the vast continent from the Pacific to the Atlantic ocean. His first plan for the purpose was that of embarking in a vessel, which was then preparing to sail, on a voyage of commercial adventure, to Nootka found, on the western coast of America; and with this view he expended in sea-torties the greatest part of the money with which he had been supplied by the liberality of fit

for Joseph Banks, who has eminently distinguished himself in this way on other occasions for the promotion of every kind of useful science. But this scheme was frustrated by the rapacity of a custom-house officer; and therefore Mr. Ledyard determined to travel over land to Kamtschatka, from whence the passage is extremely short to the opposite coast of America. Accordingly, with no more than ten guineas in his purse, which was all that he had left, he crossed the British channel to OÛtend, towards the close of the year 1786, and by the way of Denmark and the Sound, proceeded to the capital of Sweden. As it was winter, he attempted to traverse the gulf of Bothnia on the ice, in order to reach Kamtschatka by the shortest course; but finding, when he came to the middle of the sea, that the water was not frozen, he returned to Stockholm, and taking his course northward, walked to the Arctic circle, and passing round the head of the gulf, descended on its eastern side to Peterburg, where he arrived in the beginning of March 1787. Here he was noticed as a person of an extraordinary character; and though he had neither stockings nor shoes, nor means to provide himself with any, he received and accepted an invitation to dine with the Portuguese ambassador. From him he obtained twenty guineas for a bill, which he took the liberty, without being previously authorized, to draw on sir Joseph Banks, concluding, from his well known disposition, that he would not be unwilling to pay it. By the interest of the ambassador, as we may conceive to have been probably the case, he obtained permission to accompany a detachment of stores, which the empress had ordered to be sent to Yakutz, for the use of Mr. Billings, an Englishman, at that time in her service. Thus accommodated, he left Peterburg on the 21st of May, and travelling eastward through Siberia, reached Irkutsk in August; and from thence he proceeded to Yakutz, where he was kindly received by Mr. Billings, whom he recollected on board captain Cook's ship, in the situation of the astronomer's servant, but who was now entrusted by the empress in accomplishing her schemes of discovery. He returned to Irkutsk, where he spent part of the winter; and in the spring proceeded to Oczakow, on the coast of the Kamtschatkan sea, intending, in the spring, to have passed over to that peninsula, and to have embarked on the eastern side in one of the Russian vessels that trade to the western shores of America; but finding that the navigation was completely obstructed, he returned to Yakutz, in order to wait for the termination of the winter. But whilst he was amusing himself with these prospects, an express arrived, in January 1788, from the empress, and he was seized, for reasons that have not been explained, by two Russian soldiers, who conveyed him in a sledge through the deserts of Northern Tartary to Moscow, without his clothes, money, and papers. From Moscow he was removed to the city of Moialoff, in White Russia, and from thence to the town of Tolochin, on the frontiers of the Polish dominions. As his conductors parted with him they informed him, that if he returned to Russia he would be hanged, but that if he chose to go back to England, they wished him a pleasant journey. Distressed by poverty, covered with rags, infested with the usual accompaniments of such clothing, harassed with continual hardships, exhausted by disease, without friends, without credit, unknown, and reduced to the most wretched state, he found his way to Konigsberg. In this hour of deep distress, he resolved once more to have recourse to his former benefactor, and fortunately found a person who was willing to take his draft for five guineas on the president of the Royal Society. With this assistance he arrived in England, and immediately waited on sir Joseph Banks. Sir Joseph, knowing his disposition, and conceiving,

as we may well imagine, that he would be gratified by the information, told him, that he could recommend him, as he believed, to an adventure almost as perilous as that from which he had just returned; and then communicated to him the wishes of the Association for discovering the Inland Countries of Africa. Mr. Ledyard replied, that he had always determined to traverse the continent of Africa, as soon as he had explored the interior of North America, and with a letter of introduction by sir Joseph Banks, he waited on Henry Beaufoy, esq. an active member of the fore-mentioned association. Mr. Beaufoy spread before him a map of Africa, and tracing a line from Cairo to Sennar, and from thence westward in the latitude and supposed direction of the Niger, informed him that this was the route by which he was anxious that Africa might, if possible, be explored. Mr. Ledyard expressed great pleasure in the hope of being employed in this adventure. Being asked when he would set out? "Tomorrow morning" was his answer. The committee of the society assigned to him, at his own desire, as an enterprise of obvious peril and of difficult success, the task of traversing from east to west, in the latitude attributed to the Niger, the widest part of the continent of Africa. On the 30th of June, 1788, Mr. Ledyard left London; and after a journey of 36 days, seven of which were consumed at Paris, and two at Marfeilles, he arrived in the city of Alexandria. On the 14th of August, at midnight, he left Alexandria, and sailing up the Nile, arrived at Cairo on the 10th. From Cairo he communicated to the committee of the society all the information which he was able to collect during his stay there; and they were thus sufficiently apprized of the ardent spirit of inquiry, the unwearied attention, the persevering research, and the laborious, indefatigable, anxious zeal with which he pursued the object of his mission. The next dispatch which they were led to expect, was to be dated at Sennar: the terms of his passage had been settled, and the day of his departure was appointed. The committee, however, after having expected with impatience the description of his journey, received with great concern and grievous disappointment, by letters from Egypt, the melancholy tidings of his death. By a bilious complaint, occasioned probably by vexatious delay at Cairo, and by too free an use of the acid of vitriol and tartar emetic, the termination of his life was hastened. He was decently interred in the neighbourhood of such of the English as had ended their days in the capital of Egypt.

Mr. Ledyard, as to his person, scarcely exceeded the middle size, but he manifested very remarkable activity and strength; and as to his manners, though they were unpolished, they were neither uncivil nor unpleasing. "Little attentive to difference of rank," says his biographer, "he seemed to consider all men as his equals, and as such he respected them. His genius, though uncultivated and irregular, was original and comprehensive. Ardent in his wishes, yet calm in his deliberations; daring in his purposes, but guarded in his measures; impatient of controul, yet capable of strong endurance; adventurous beyond the conception of ordinary men, yet wary and considerate, and attentive to all precautions, he appeared to be formed by nature for achievements of hardihood and peril."—"They who compare the extent of his pilgrimage through the vast regions of Tartary with the scantiness of his funds, will naturally ask, by what means he obtained a subsistence on the road? All that I have ever learned from him on the subject was, that his sufferings were excessive, and that more than once he owed his life to the compassionate temper of the women. This remark is strongly confirmed by the following extract from his account of his Siberian tour: "I have always remarked, that women, in all countries, are civil, obliging, tender, and humane :

humane: that they are ever inclined to be gay and cheerful, timorous and modest; and that they do not hesitate, like men, to perform a generous action.—Not haughty, not arrogant, not supercilious; they are full of courtesy, and fond of society; more liable, in general, to err than man; but in general, also, more virtuous, and performing more good actions than he. To a woman, whether civilized or savage, I never addressed myself in the language of decency and friendship, without receiving a decent and friendly answer. With man it has often been otherwise. In wandering over the barren plains of inhospitable Denmark, through bonny Sweden and frozen Lapland, rude and churlish Finland, unprincipled Russia, and the wide-frold regions of the wandering Tartar, if hungry, dry, cold, wet, or sick, the women have ever been friendly to me, and uniformly so; and to add to this virtue (so worthy the appellation of benevolence), these actions have been performed in so free and so kind a manner, that if I was dry, I drank the sweetest draught; and if hungry, I eat the coarsest morsel with a double relish." Similar to this was the experience of Mr. Park. (See AFRICA.) Nevertheless, though Mr. Ledyard found frequent relief and assistance from female attention and kindness, he seems on many occasions to have endured the utmost pressure of distresses. "I am accustomed," said he, in his last conversation with the writer to whom we are indebted for this account of him, "to hardships. I have known both hunger and nakedness to the utmost extremity of human suffering. I have known what it is to have food given me as charity to a madman; and I have at times been obliged to shelter myself under the miseries of that character to avoid a heavier calamity. My distresses have been greater than I have ever owned, or ever will own to any man. Such evils are terrible to bear; but they never yet had power to turn me from my purpose. If I live, I will faithfully perform, in its utmost extent, my engagement to the society; and if I perish in the attempt, my honour will still be safe, for death cancels all bonds." Proceedings of the Association for promoting the Discovery of the Interior Parts of Africa. London, 1790.

LEE, NATHANIEL, son of a clergyman, was educated at Westminster school under Dr. Busby. He was admitted a scholar of Trinity college, Cambridge, in 1668, but quitted the university without a fellowship, and attempted to push his fortune at court. In this he was unsuccessful, and then began to write for the stage. His first piece was the tragedy of Nero, produced in 1675, and from this time, till 1681, he produced one tragedy every year, all which appear to have had temporary success. He made a trial of his talents as an actor, but did not succeed in the attempt. About the year 1684, he was bereaved of his understanding, an affliction which proved so severe as to baffle the powers of his medical friends, and which obliged his relatives to obtain for him an asylum in Bedlam. Here he remained about four years, during which he was able to write two tragedies. He died, in 1690, so poor, as to have been buried by the parish of St. Clement Danes. According to Addison, Mr. Lee was equal to any of his contemporaries in a natural genius for tragedy, but his impetuosity led him into a turgid style, approaching to bombast, and he was apt to bury his thoughts in such a cloud of words, that it was difficult to discern their beauty. He is reckoned to excel in representing the passion of love, which he sometimes touched with exquisite tenderness and force. Two of his pieces only are, at this time, ever brought on the stage, viz. his "Theodorus," and his "Rival Queens." Biog. Brit.

LEE, in Geography, a river of Ireland, which rises in the mountains, on the western border of the county of Cork,

and having passed Loughs Gougane-barra and Allun, flows eastward through the barony of Mulkerry. It receives in its way the rivers Sullane, Dripsey, Blarney, and Bride, with several smaller streams, and below the city of Cork, which is built chiefly on islands formed by it, it expands into that capacious and beautiful harbour, called Cork harbour. (See CORK.) There is also a small river of this name, which runs into Tralee bay, in the county of Kerry.

LEE, a county of Virginia in the S.W. corner of the state, bounded S. by North Carolina, and W. by Kentucky: its form is triangular, two sides being 60 miles long, and the other about 30. In this county is Powell's fertile valley, but a third part of the county is mountainous. It contains 3295 free inhabitants, and 243 slaves. The chief town is Jonesville.—Also, a small town in Stafford county, New Hampshire, about 12 miles N. of Exeter; formerly part of Dover and Durham; incorporated in 1766, and containing 978 inhabitants.—Also, a township in Berkshire county, Massachusetts; 140 miles W. of Bolton; incorporated in 1777, and containing 1267 inhabitants. Housatonic river runs towards the south through this town.

LEE, a term variously used at sea; though its general use be to signify the part towards, or opposite to the wind.

This expression is chiefly used when the wind crosses the line of a ship's course, so that all on one side of her is called to windward, and all on the opposite side, to lee-ward. Hence,

LEE-Shore is that on which the wind blows; so that to be under the lee of the shore, is to be close under the weather-shore, or under wind; or at a short distance from the shore which lies to windward.

A-LEE the Helm. See A-LEE.

LEE, Hard a. See HARD.

LEE-Hatch, take care of the, is a word of command to the man at the helm, to take care that the ship do not go to the lee-ward of her course.

To LEE-ward, denotes towards that part of the horizon which lies under the lee, or whither the wind bloweth.

LEE-ward Ship, is one that is not fall by the wind, or which doth not fall so near the wind, nor make so good way as she should; or which is much to leeward of her course, when sailing close-hauled.

LEE, To lay a Ship by the, or to come up by the Lee, is to bring her so, that all her sails may lie flat against her masts and shrouds, and that the wind may come right upon her broadside.

LEE-Rangs, are ropes reeved into the cringles of a yacht's or hoy's sails.

LEE-Larches, signify the sudden and violent rolls which a ship often takes to the leeward in a high sea, particularly when a large wave strikes her on the weather-side.

LEE-Side, denotes all that part of a ship or boat, which lies between the mast and the side farthest from the direction of the wind; or that half of a ship which is pressed down towards the water by the effort of the sails, as separated from the other half by a line drawn through the middle of her length; that part of the ship, which lies to the windward of this line, is accordingly called the weather-side. Thus, if a ship sails southward, with the wind at east, then is her star-board, or right side, the lee-side; and the larboard, or left, the weather-side.

LEE-Way, or Lee-ward Way of a Ship, is the angle made by the line on which the ship should run according to her course, or the point of the compass steered upon, and the real line of the ship's way occasioned by contrary winds, and a rough sea.

All ships are apt to make some lee-way; so that in casting

up the log-board, something must be allowed for lee-way. But the lee-way made by different ships, under the same circumstances of wind and sailing, will be different; and even the same ship, with different fails, will have more or less fail abroad, will make more or less lee-way. The ordinary rules of allowing for it are these: they were given by Mr. John Buckler to the late Mr. William Jones, who first published them about the year 1702.

1. When a ship is close-hauled, has all her sails set, the water smooth, and a moderate gale of wind, she is then supposed to make little or no lee-way. 2. Allow one point, when it blows fresh, that the small sails are taken in. 3. Allow two points, when the top-fail must be close-reefed. 4. Allow two points and a half, when one top-fail must be handed. 5. Allow three points and a half, when both top-fails are to be taken in. 6. Allow four points, when the fore-course is handed. 7. Allow five points, when trying under the main-fail only. 8. Allow six points, when both main and fore-courses are taken in. 9. Allow seven points, when the ship tries a-hull, or all fails are handed. When the wind has blown hard in either quarter, and shifts across the meridian into the next quarter, the lee-way will be lessened. But in all these cases, respect must be had to the roughness of the sea with the trim of the ship; and hence the mariner will be able to correct his course.

LEEA, in *Botany*, so named by Linnæus, at the suggestion of Professor David Van Royen of Leyden, in honour of the late Mr. James Lee, of the Vineyard at Hammer-smith, author of an Introduction to Botany, of which the first edition appeared in 1760, the fourth in 1810. This book, whose principles are borrowed from Linnæus, but which is particularly valuable for its glossaries and tables of synonyms, has been of primary use in making the Linnæan system popular here. Its author was one of the best practical botanists, and most experienced and successful cultivators. He loved to encourage and assist all who had a taste for natural history, and died generally esteemed, at an advanced age, in July 1795, leaving a son in every respect worthy to sustain and extend his reputation. Linn. Mant. 17. Schreb. 638. 796. Willd. Sp. Pl. v. 1. 1177. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 50. Juss. 153. (Aquilicia; Linn. Mant. 2. 146. Schreb. 154. 824. Juss. 266. Lamarck. Illust. t. 139. Gærtn. v. 1. 275. t. 57. f. 7.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Meliæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, coriaceous, bell-shaped, five-toothed, permanent. *Cor.* of one petal; tube the length of the calyx; limb in five ovate, acute, recurved segments. Nectary attached to the inside of the tube, erect, pitcher-shaped, shorter than the tube, with five notched lobes. *Stam.* Filaments five, connected with the nectary, between the lobes, a little way down, incurved; anthers ovate, versatile, cohering together before impregnation and covering the stigma. *Pist.* Germen superior, nearly globular; style simple, shorter than the nectary; stigma capitate. *Peric.* Berry orbicular, depressed, with five prominences, of one cell. *Seeds* five, gibbous at the outside, angular at the inner.

Efl. Ch. Corolla of one petal; limb in five segments. Nectary of one leaf attached to the tube, five-cleft, erect, bearing the stamens. Berry inferior, with five seeds.

1. *L. jambucina*. Elder-leaved Leea. Willd. n. 1. (Aquilicia jambucina; Linn. Mant. 2. 211. Cavan. Diff. 372. t. 218. Lamarck. Dict. v. 1. 217. Staphylea? indica; Burm. Ind. 75. t. 24. f. 2. Frutex aquosus fœmina; Rumph. Ambon. v. 4. 103. t. 45. Nalagu; Rheede Hort. Mal. v. 2. 43. t. 26.)—Stem furrowed and angular,

smooth. Leaves smooth, doubly pinnate; the terminal leaflet largest.—Native of the East Indies, from whence it was procured for the Kew garden, by Sir Joseph Banks, in 1790. It is a smooth shrub or small tree ten or twelve feet high, with the aspect of Elder; the branches timid at the insertion of the leaves, striated and more or less angular. *Leaves* alternate, large, doubly pinnate; leaflets stalked, opposite, elliptic-oblong, pointed, veiny, strongly serrated, very smooth, paler beneath; the odd ones largest. *Pavicles* cymose, opposite to the leaves, pubescent. *Flowers* small, whitish. *Berries* rather acid, the size of a pea, depressed, black, purplish internally. A decoction of the roots or wood seems, by the accounts given of its uses, to be a valuable tonic medicine.

2. *L. aquata*. Downy Leea. Linn. Mant. 124. (Cajoe toea of the Malays.)—Stem round, downy. Leaves doubly pinnate, rough.—Native of the East Indies, from whence Mr. Lee received and cultivated it before the year 1777. We find no figure of this species. Linnæus did not distinguish it from the former, but they are very different. In both the leaves are bipinnate, or rather ternate in their first division, pinnate in the second; but in this species the terminal leaflet is not larger than the rest, except in some of the lateral divisions, and all the leaflets, as well as their stalks, are rough with minute rather rigid pubescence. The serratures are less strong than in *L. jambucina*.

3. *L. crispata*. Wing-stalked Leea. Linn. Mant. 124. Meerburgh Ic. v. 1. t. 50. (*L. pinnata*; Andr. Repof. t. 355.)—Stem angular, with crisped wings. Leaves simply pinnate.—Native of the East Indies, not, as Linnæus supposed, of the Cape of Good Hope. The roots are tuberous. *Stem* scarcely shrubby, remarkably bordered, as are the leaf-stalks, with parallel, partly crisped, wings. *Leaves* pinnate, generally of two pair, with an odd one, of elliptical, pointed, strongly serrated and copiously veined leaflets, roughish to the touch when dry, but not pubescent. *Flowers* much as in the former, with channelled, angular, or winged stalks. Each segment of the corolla, according to Andrews, is hooded at the point. We have seen one leaf imperfectly bipinnate.

It appears, from the Linnæan herbarium, that Linnæus originally destined the name of *Hippia* for his *Leea*; but he afterwards applied the former to a very different genus. (See HIPPIA.) From the same source the identity of his *Leea* and *Aquilicia* was first discovered, and the latter name gives place, as being the more recent, to say nothing of the claims of the former respecting the person it commemorates.

LEEBYRAN, in *Geography*, a small island in the East Indian sea, near the north-east coast of Borneo. N. lat. 6° 1'. E. long. 118° 12'.

LEECH, in *Zoology*. See HIRUDO.

The history of this animal, and the structure of its parts, by means of which it becomes useful to us, in supplying very happily the place of the lancet, with every other particular circumstance of its life and food, have been very accurately given by Mr. Morand, in the Memoirs of the Academy of Sciences, in the year 1739.

The more vulgarly known particulars of this animal are briefly mentioned by this gentleman; such are the cutaneous annules of its outer coat, the beautiful arrangement of the several rays, the colours, the pyramids, and points, with which it is ornamented; the avidity with which this creature seizes the flesh of animals; the manner of its applying its mouth; the vermicular motion observed within it while sucking, which resembles the common motion of deglutition; the time they have been known to live in the water without

without any visible food; and the faculty they have, in common with many other animals, of moving when cut into several pieces: these the author supposes already sufficiently known, and passes on to what is less so, the structure of its inner parts.

The part of this animal, by which it pierces the skin of any creature to get at its blood, is generally called, simply, its *mouth*; but it really consists of five different parts, which are confounded under that general name. These are two regular lips, a cavity, which is properly the mouth, certain instruments to pierce with, others which serve it for sucking, and finally a sort of throat, or œsophagus, through which it swallows the blood. When the leech is in a state of rest, its upper lip forms a regular femicircle, and the lower a portion of a much larger circle.

When the creature lengthens its head to move, the femicircle of the upper lip becomes two oblique lines, the junction of which makes a salient angle, which the creature applies to whatever it would fix itself to. That angle is marked by a regular black spot on the outer edge of the lip. The extreme softness of the fibres of this part makes it very serviceable to the animal, in that it readily assumes any figure, according to the occasion of seizing any thing solid, in order to move the rest of its body; or on the flesh of an animal, to give opportunity to the piercing instruments to exert their force and action.

Whether it be for either of these purposes, that the creature fixes its mouth, the two lips regularly fix, and make in this state a sort of acetabulum, like the hollow of the tail. This may be seen in their fixing on the sides of a glass-vessel in which they are kept, and the mouth, or aperture between the lips, is distinctly seen. This mouth is formed, like the lips, of such extremely supple fibres, that it takes the figure of the part to which it is applied, and fixes perfectly close to it. When the lips are fixed on the flesh, in order to suck, this little mouth continues moveable under them, and searches over the compass of flesh, inclosed in the larger circle of the lips, for the spot where it will be easiest to draw much blood.

Within this mouth is placed the instrument for piercing the skin, which is more than the mere sucker of the gnat, or the like kind of flies; since the quantity of blood to be sucked by the leech, is much larger, and the aperture of the vessel must therefore also be larger. The shape of this weapon may be discovered by examining the wound it leaves. This is composed of three cuts, making three rays, and uniting in a centre, under equal angles. This structure of the wound is most distinctly seen when the swelling is gone down, and the skin is clean; and this is usually on the fourth day after the application. The three openings are then plainly seen not to be punctures, but absolute wounds, or cuts, as if made by a fine lancet. In examining the creature, the organ, destined for making the wound, is found to be placed between the aperture of the lips and the bottom of the mouth; and on cutting up the animal, and drawing the finger carefully over this part of it, there is felt a roughness like that of a fine file, which evidently is owing to some rough substance, of the hardness of bone. This is, in reality, a number of fine and sharp teeth; and when examined by a microscope, they are found to be disposed in three series on three ribs, or, as they may be called, jaws; each of which is placed along the middle of a strong muscle of its own length; and these corresponding regularly to a triangular opening, which the creature has in its mouth. When that has seized on a proper part for the getting blood, and is fixed, these muscles exert their action, and strike in the teeth through the skin.

These are the instruments which pierce the vessel which is to afford the blood; and for the receiving it into the body of the animal, there is between these rows of teeth, or in the common centre of the mouth, a small aperture; and within this there is a little body to be discovered, which by its motion seems very plainly to be a tongue, and which probably acts as a piston to take up the blood flowing from the triple wound, in the centre of which it naturally stands, while the larger circle of the lips, &c. perform the office of the body of the pump, and the blood is easily, by this means, conveyed into the body of the animal. Finally, between the root of the tongue and the beginning of the stomach, there is a space of two lines in length, in which it is easy to discover two different arrangements of fibres; the one set are flat and plain, the others are circular. These evidently have a power of widening or contracting the cavity of the pump, and by that means facilitate its office; the plane ones contracting in length, to enlarge the capacity, and the circular ones determining the blood towards the stomach, by their power of contracting the hollow, when the blood is received. The blood from hence enters into a membranaceous sort of sack, which serves the animal for the stomach and guts, and occupies the greatest part of the body of the creature. If the air is admitted into the body by the mouth, it may be seen to make its way down a longitudinal canal, and fill, as it goes, a number of sacks, or little bags, which are on each side. These vesicles receive the blood, and becoming filled with it, swell out the body of the animal to a great size. It remains here many months, and nourishes the creature; and if any thing is excreted from it, it must be merely by an insensible perspiration; since the creature has no anus, so far as can be yet discovered, nor any aperture which can supply the place of one.

Leeches are able to live in oil; and when removed out of this liquor into water again, they throw off a tender skin, or film, of the regular shape of their body, and resembling the skin of an eel in miniature. Their living in oil seems a proof, that their organs of respiration are not placed on the outside of their bodies, as they are in many small animals, which therefore die on being only rubbed over with oil. But the leech seems to respire by the mouth; and this may be the more plainly discovered, if the water, in which it is kept, be gently heated; for then the animal, being uneasy, breathes hard, and very visibly.

If a leech be kept in an eight-ounce glass phial, about three-fourths filled with water, it will indicate the changes of the weather, in the manner of a weather-glass. Thus, if the weather continues serene and beautiful, the leech lies motionless at the bottom of the phial, rolled in a spiral form: if it rains either before or after noon, it is found at the top of its lodging, where it will remain until the weather be settled: if we are to have wind, the leech gallops about its limpid habitation with amazing swiftness, and seldom rests until it begins to blow hard: if a remarkable storm of thunder or rain is to succeed, for some days before, it lodges almost continually without the water, and discovers great uneasiness, in violent throws and convulsive like motions. In frost, as in clear summer weather, it lies constantly at the bottom; and in snow, as in rainy weather, it dwells at the very mouth of the phial.

The phial should be covered at the mouth with a piece of linen rag, and the water should be changed once a week in the summer, and once a fortnight in the winter. *Gent. Mag.* vol. xxiii. p. 28.

LEECH, *Sca.* See *HIRUDELLA marina*.

LEECH is also a name given by Boccone to a very particular water-animal, which he found sticking to the sides of the *niphias*, or sword-fish.

He calls it *hirudo*, or *acus cauda utrinque pennata*, and observes, that it is slightly mentioned by Gesner, and by Johnson, in their books of fishes. It is about four inches long; the belly is white and cartilaginous, and transparent; there is no regular head to be seen, but only a hollow snout in the place of the head; this is covered with a very hard membrane, and differs extremely from the skin of the belly: this snout it thrusts up to the end into the body of the fish, and sucks its blood with it; it has a tail shaped like a feather, and under it two slender filaments of fibres, longer than its whole body. By means of these, when it is not fastened to the body of the fish, it clings to stones, or sea-plants, to prevent its being carried away by the motion of the water; and when it is on the body of the fish, these serve it to hold much more fastly with, than it otherwise could do. This creature miserably afflicts the sword-fish, but it is itself as much tormented by an animal that preys on its blood and juices. This is a sort of louse, which is always found upon it; it is of a brownish colour, and it is generally found fastened toward the tail of the creature, sticking as firmly as a limpet to a rock; it is nearly of the bigness of a pea, and when crushed a little, will thrust out several slender filaments. This leech is not found, so far as has yet been observed, on any other fish but the sword-fish; nor this louse among other creatures, besides this leech. Phil. Trans. N. 100.

LEECHES, *Utility of, in the Cure of Diseases.*—Bleeding, or the taking away of blood, for the alleviation and cure of diseases, is frequently one of the most powerful means to which the physician and surgeon can have recourse for the relief of their patients. It is divided into *general* and *topical*; the first signifying the evacuation, as made from a large vein in the arm, or the temporal artery, the external jugular vein, &c; the second denoting the evacuation of blood directly from the vessels of the part affected, or its vicinity, by scarifications, cupping, or leeches. In the article BLEEDING are described most of the surgical methods of taking away blood, with the exception of that by leeches, which more properly belongs to the present place, and of *Cupping* and *Scarifications*, for an account of which the reader is referred to these respective terms.

The *hirudo medicinalis*, as the term denotes, is the proper kind for medical purposes; and, when it has been caught in a clear piece of water, is not full of blood, and is hungry, in consequence of being kept for some time in a vessel of pure water, it is in the best condition for use. According to Schmucker, even the medicinal leech, if taken out of unclear, muddy, stagnant water, will cause pain, swelling, and inflammation, after being applied. *Vermischte Chir. Schriften*, vol. i. p. 86. edit. 2.

With respect to the art of collecting medicinal leeches, the best time for taking them is when they spawn in the earliest warm weather of the year. June and July are accounted favourable months, if there is a good deal of sun, and the wind is either very still, or blows gently from a southerly point. It would be in vain to endeavour to catch them in cold weather attended with northerly winds. The *hirudo medicinalis* inhabits clear lakes and ponds in warm situations, and streams flowing through vallies. In cold and woody countries, the horse leech can only be met with. The warmer the situation of the water is, and the fatter the soil, the thicker and larger are the leeches. Those which are caught in waters abounding with fish, do not bite and suck so well, as others taken out of poorer places. Fresh

ly leeches bite the most readily; but when they have been kept a long while, or have been put out of temperate into very cold water, they generally bite with less avidity.

With regard to the mode of applying leeches, the part on which they are about to be put may first be washed with some clean water and well dried. The leeches are then to be placed on it with the fingers, either one by one, or all of them together, by putting them first into a tumbler, and then applying this to the skin, in the manner of a cupping glass. The leeches should generally be suffered to fall off the part spontaneously, which they commonly do, as soon as they are well distended. But when the patient's weakness, or any other circumstance, requires them to be more speedily removed, they may easily be made to drop off by sprinkling them with a little salt or snuff. For the purpose of inducing leeches to bite with greater facility, some practitioners first wet the part on which they are to be put with a little milk, or milk and sugar.

On some occasions, the application of leeches will procure as copious an evacuation as phlebotomy itself. The quantity of blood which may sometimes be taken away by twelve leeches, would surprize the inexperienced. When the bites are exposed to the steam of warm water, or fomented after the leeches have dropped off, the bleeding may often be kept up for an extraordinary length of time. The writer of this article has known instances, where furcious have been detained for nearly twenty-four hours, in employing means to suppress the continuance of the bleeding from the bites of leeches on inflamed parts. In cases of hernia humoralis, where the scrotum has been much reddened and inflamed, he has often seen the hemorrhage, from the application of leeches, last a very unpleasant length of time. Indeed, the records of surgery prove, that the bleeding from the bites of leeches may even continue to a dangerous extent. Pelletan mentions a case, where an infant, four months old, bled to death, in consequence of the application of six leeches to the chest, some women who were in attendance having contented themselves with merely wiping away the blood with cloths, as fast as it flowed out. (See his *Clinique Chirurgicale*, tom. ii. p. 243.) In general, however, the bleeding, after leeches have dropped off, readily ceases, either of itself or on cold being applied; and it is only when the part is highly inflamed, or excessively vascular, as we know the skin of a very young infant to be, that the subsequent hemorrhage is disposed to continue long. In many instances, the continuance of the bleeding a certain time is a most desirable circumstance, as by this means a more effectual quantity of blood can be taken away than could otherwise be accomplished.

We learn from Galen, that Hippocrates was acquainted with the medical utility of leeches. (De *Hirudinibus* cum comment. Sebizio.) In inflammation of the liver, they were preferred by Aretæus, of Cappadocia, to cupping-glasses; and they are made frequent mention of in the writings of Dioscorides, Celsus, and Paulus Ægineta. Pliny thought, that leeches might be employed with several intentions, as, in plethoric cases, they extract the blood like cupping-glasses, and, according to his conjectures, also opened the pores. (Hist. Natural. l. xxxii. c. 10.) Horace has taken notice of these useful little animals in the following line of his satires.

“Non misura cutem nisi plena cruoris hirudo.”

The Arabian physicians well knew the usefulness of leeches, and were in the habit of directing them to be applied in melancholic and hypochondriacal cases. Rhazes, in particular, recites numerous cures which he effected with their assistance.

ance. Paracelsus used to apply them in cases of jaundice. By the chemical practitioners of medicine, leeches were not at all employed, because they were accustomed to reprobate all evacuations of blood as useless and hurtful; and Van Helmont would not suffer them to be applied to an hemorrhoidal swelling.

The use of leeches, in the practice of physic and surgery, appears to have been revived by Sennertus and Zacutus Lusitanus.

It would be almost an endless task to enumerate the great variety of medical and surgical cases in which leeches may be used with advantage. We may state, indeed, that in all inflammatory affections they are frequently of considerable service. In inflammations about the throat, in the abdomen, thorax, or cranium, or in the limbs and more superficial situations, the benefit derived from the application of leeches, can often be obtained by no other means. The great good which they often do in inflammatory diseases of the eye, joints, and testis, is acknowledged by every practitioner, as well as the relief which they speedily afford in cases of inflamed hemorrhoidal tumours. Their utility in inflammations of the breast, and in alleviating the pain, and even retarding the progress of scirrhous swellings of the same part, deserves also to be mentioned. That they sometimes prove even capable of curing and reducing many indurations of the breast, is a fact proved by daily experience. Nor must we forget the beneficial effects, frequently arising from the application of leeches in various examples of buboes, scrofulous and sympathetic, as well as venereal.

In the majority of cases, however, we are not to imagine that one application of three, four, or even a dozen leeches, is enough to try their efficacy; in general their application must be repeated from time to time, and, in some instances, once or twice a-day, according to the urgency of the symptoms.

In infants of tender years, and persons who have a particular dread of venesection, leeches may be used for the relief of all diseases which require blood to be taken away; and this method of bleeding has the advantage of not being likely to induce swooning, debility, and languor, by the blood being drawn too suddenly.

In many cases, where the practitioner is fearful of venturing upon general bleeding, the employment of leeches may often be tried with greater safety.

In painful affections of the ear and teeth, in inflammations and swellings of the gums, and in numerous inflammatory diseases affecting the parts about the neck and throat, topical bleeding with leeches proves of infinite service, either alone, or in conjunction with general bleeding, according to the nature and circumstances of the case.

In numerous instances of extravasations of blood under the skin, ecchymoses, contusions, &c. leeches are frequently applied with great benefit to the patient.

In cases of quinly, when deglutition has been quite obstructed, and repeated venesection has proved unavailing, Schmucker assures us, that he has found the application of leeches attended with an extraordinary degree of efficacy. The same experienced practitioner also observes, that in pleurifies, he has found topical bleeding with leeches even more useful than blisters.

Whitlows, which can so seldom be cured without suppuration, Schmucker has sometimes resolved, by applying to them leeches and the saturnine lotion in an early stage of the complaint.

This distinguished surgeon likewise confirms, how superiorly useful the application of sixteen or twenty leeches to the perineum frequently proves in cases of retention of

urine, when venesection, the warm bath, and other means alone are ineffectual. Vermischte Chirurgische Schriften, vol. ii. art. 2.

LEECH, or LEETCH of a Sail, in a Ship, the outward edge or skirt of the sail from the caring to the clew, or rather the middle of the fall between these two.

The leeches of all sails, whose tops and bottoms are parallel to the deck, and at right angles with the masts, are denominated from the ship's side, and the sail to which they belong, as the Starboard leech of the main-fail, the lee-leech of the fore-top-fail, &c. But the sails which are fixed obliquely upon the masts, have their leeches named from their situation with respect to the ship's length; as the fore-leech of the mizen, the after-leech of the jib, or fore-stay-fail, &c. Falconer.

LEECH, or Leech-lines, are certain ropes fastened to the leeches of the main-fail and fore-fail, and communicating with blocks under the opposite sides of the top, whence they pass downwards to the deck, serving to truss up those fails to the yard, as occasion requires. See BRAILS.

LEECH-ROPE, is a name given to that part of the bolt-rope, to which the border of a fail is sewed. In all sails, whose opposite leeches are of the same length, it is terminated above by the caring, and below by the clew. Falconer.

LEECHMAN, WILLIAM, in *Biography*, a learned and excellent Scotch divine, was born at Dolphinston, in Lanerkshire, in the year 1706. He was initiated in grammar-learning at his native place, from whence he removed to the university of Edinburgh. Here he distinguished himself by his great proficiency in different branches of learning. He began his theological studies in 1724, and in 1727 he was introduced into the western part of Scotland, which was destined hereafter to be the principal scene of his usefulness. He undertook the education of a young gentleman at Caldwell, in Renfrewshire, where he resided in the summer months, but during the remainder of the year he lived at Glasgow, and was honoured with the friendship of professors Hutcheson and Dunlop. About the beginning of 1731 he was licensed as a preacher, but it was not till the year 1736 that he had any prospect of preferment. He was now ordained minister of Beith, and remained in the discharge of the duties attached to that office during seven years. In 1740 he was elected moderator of a meeting of the synod at Irvine, and opened the assembly at Glasgow on the 7th of April, 1741, with a sermon to the clergy "On the temper, character, and duty of a minister of the gospel." This is thought to be one of the ablest charges ever delivered from the pulpit: it has passed through many editions, and is still in very high reputation. In 1743 he published a much longer discourse on "The Nature, Reasonableness, and Advantages of Prayer; with an Attempt to answer the Objections against it." This sermon, as well as that just noticed, excited great attention at the time of the publication, and it has been frequently reprinted since. He was, about this time, invited to settle with a congregation at Belfast, in Ireland, with the promise of a better salary than that which he enjoyed at Beith. This offer, upon due deliberation, he declined, and he was shortly after elected to the professorship of theology at the university of Glasgow; an honour which he obtained only by the casting vote of the president. The opposite party did all in their power to prevent his being fixed in the situation: they even commenced a process of heresy against him, which had a direct tendency to injure his reputation and usefulness, and to expose him to general odium. The charge was founded on the sermon on prayer, which his enemies considered as having laid too little stress on the atonement and intercession of Christ.

Christ. A paper of remarks was produced, consisting of eight articles, of what they deemed heretical omiffions. To each of the remarks the professor gave in written answers, which were neither deemed satisfactory to the committee nor to the presbytery, under whose authority they acted. Mr. Leechman appealed to a higher court, viz. the synod, the members of which, after hearing all that could be adduced on both sides of the question, almost unanimously determined, that there was no reason to charge him with any unsoundness in the passages of the sermon complained against. "Mr. Leechman's character, both as a preacher and professor, shone out the brighter after this cloud was dissipated. Some of those who had appeared his keenest adversaries in the church process, lived with him afterwards on terms of sincere friendship; even the prejudices of the common people in Glasgow gradually subsided; so that he came to be considered there, as he had always been in every other place, a very acceptable preacher." Soon after he had been established in the professorship, he took the degree of doctor in divinity. He continued in the theological chair seventeen years, vindicating and establishing the grand truths of natural and revealed religion, in answer to the principal objections made to them by Mr. Hume, lord Bolingbroke, and other sceptical writers. He had, in his lectures, a remarkable talent of selecting what was most important and striking on every subject that he handled: his arguments were solid, founded on indisputable facts; and they were urged with a degree of warmth which carried his auditors along with him; for they were addressed equally to the judgment and the heart. Dr. Leechman's fame extended far and wide, the Divinity-hall at Glasgow was crowded, in his time, with a greater number of scholars than any other in Scotland: and his numerous scholars, however they might differ in their sentiments on speculative theology and church government, were all cordially united in their affection and veneration for their master. In the year 1761, Dr. Leechman was raised to the office of principal of the university of Glasgow by a presentation from the king. He had previously to this been in a very bad state of health, and this change in his avocations was probably the means of prolonging his valuable life for five-and-twenty years. Though released from the more fatiguing part of his duties, he could not remain inactive, but entered warmly into every scheme for the benefit and improvement of the society, proposed by other professors, and prosecuted some schemes of his own suggestion. He gave a lecture, for some time, once a week, to the students in divinity, and weekly lectures to the whole university. Dr. Leechman's faculties remained in full vigour amidst the increasing infirmities of old age, and his taste for valuable knowledge continued as acute as ever. His mind seemed to be in a great measure independent of all bodily infirmities and connections. In September, 1785, he experienced a violent paralytic stroke, from the effects of which he speedily recovered: but a second shock of the same kind in the following month deprived him of the power of his whole left side. Still he continued in the full possession of his mental faculties, and was as intelligent, judicious, and even as acute as ever. Another attack carried him off on the third of December, 1785, when he was almost eighty years of age. Dr. Leechman committed nothing to the press, except nine sermons, which went through several editions during his life-time. These were re-published, with others, forming together two volumes, in the year 1789. To the first of these volumes is prefixed an account of the author, to which the reader is referred for more particulars relating to Dr. Leechman.

LEEDS, in *Geography*, a populous market-town in the

wapentake of Skyrack, in the West Riding of the county of York, England, is situated on the north side of the river Aire, over which is a handsome stone bridge. It is a place of great antiquity, and its name is registered in the Domesday survey. Here was formerly a strong castle, probably built by Ilbert de Lacy, which was besieged by king Stephen in 1139; and here the unfortunate Richard II. was confined about the year 1399. No vestige of this fortress remains; but its site is said to have been at a place called Mill-hill. Leeds has long been distinguished as a clothing town; though the pre-eminence it now enjoys is not of a very remote date. Leland says it is "a pretty market-town, subfitted chiefly by clothing, reasonably well builded, and as large as Bradford, but not so *quick* as it." Its growth, however, probably soon became considerable, as it was incorporated by king Charles I. At the commencement of the troubles of that reign, it was held for the king by sir William Saville; but after a sharp action, its fortifications were stormed by the forces which marched out of Bradford under sir Thomas Fairfax. A second charter was granted on the 13th of Charles II., under which the town is now governed. The trade in woollen cloth, which has raised Leeds to its present consequence, is carried on here to an extent unequalled in any place in the kingdom. The cloth-markets are held only on Tuesdays and Saturdays, and then only for an hour and a half each day; and the merchants are not allowed to buy, or even to look at cloth, but at these appointed hours. At six in the morning in summer, and seven in winter, the market-bell rings; and in a few minutes, without the least disorder, the whole market is filled, and all the benches are covered with cloth, each proprietor at the same time standing behind his own cloth. As soon as the bell has ceased the buyers enter, and having fixed on certain lots, or pieces of cloth, they proceed in a very expeditious and secret manner to bargain for the same. (A particular account of the modes of transacting business, &c. is given in the Monthly Magazine, vol. iii. p. 123, and vol. iv. p. 174.) In these places it is related that from ten to twenty thousand pounds worth of cloth, and sometimes more, is sold with a whisper only; the laws of the market are certainly more strictly observed than in any other place in England: the time of sale is terminated by another bell; and any merchant staying in the hall after the bell has ceased, forfeits five shillings. This extensive business, which used formerly to be carried on in the open street, is now conducted in two halls, which have been built for the accommodation of the clothiers. The Mixed-cloth Hall, which is the principal, was erected in 1758; it is a quadrangular building, inclosing an open area of about an hundred yards square, and is divided into seven partitions or streets, each of which contains four rows of stands; and these are the freehold property of separate manufacturers. The whole number of stands is 1770. The White-cloth Hall, built in 1775, is partitioned in a similar manner, and contains 1210 stands. Over the former building is an assembly-room, and over the latter a music-hall. The manufacture of broad cloth is now almost wholly performed by machinery, which has occasioned a considerable reduction in the price. By this means, very few hands are wanted in the first stages of the manufacture, particularly in carding and scribbling the wool, and in spinning it. This circumstance, on the first introduction of machinery, deprived great numbers of people of their customary employment.

Previous to the reign of Charles I. Leeds had but one church: here are now, however, several ecclesiastical edifices, appropriated to the established religion, and to different sects of Dissenters. The church of St. Peter, the original, is built

in the form of a cross, with a tower in the middle; and has a painting in fresco of the Ascension, by Parmentier, who presented the town with this specimen of his genius. -St. John's church was erected in 1634, at the sole expence of Mr. Harrison, who also built a free-school and a market-cross, and was in other respects a great benefactor to the town. The church of the Holy Trinity, which is an elegant structure, with a spire, was built in the eighteenth century. Eight other places of worship are appropriated to the several denominations of dissenters. Here are three almshouses, a charity-school, and an extensive work-house, in which children are taught the easy branches of the woollen manufacture. A spacious infirmary was built by subscription in the year 1786. The streets, in the upper part of the town, are narrow; but in the other parts they are broad, and the houses are mostly uniform, and many of them elegant. Here are several large open squares, the areas of which are in some cases planted, and in others used as tender grounds. The buildings are chiefly of brick, and covered with white slate; and every street has a flagged foot-way on each side. The civil government of the town is vested, by the charter of Charles II., in a mayor, twelve aldermen, and twenty-four common-council men.

Leeds is 192 miles distant from London, and 25 miles from York. In the year 1800, it contained, according to the return made to parliament, 11,599 houses, and 53,162 inhabitants: of the latter, 20,367 were slated to be employed in trade and manufacture, particularly that of woollen cloth. Two fairs are held annually; and two weekly markets, on Tuesdays and Saturdays, are well supplied with all kinds of provisions. A considerable pottery is established here, which furnishes large quantities of earthen ware, both for home consumption and exportation. By means of the rivers Aire and Calder, and the Canal Navigation, Leeds has communication with Wakefield, York, and Hull; from which latter place the woollen goods are usually shipped to foreign parts. The carriage of coals from the interior of Yorkshire is also a great source of traffic: these are carried in vessels from 45 to 60 tons burthen, to Selby, York, Howden, Hull, Beverley, and all the intermediate towns situated on the rivers Ouse and Humber. Three miles from this town are the grand and picturesque ruins of Kirkstall Abbey, seated on the banks of the river Aire. For an account of these, with an interesting print, see Day's Tour in Yorkshire, 8vo. 1805. West of the town is an ancient seat of the Vavaron family. Aikin's Description of the Country round Manchester, 4to, and Monthly Magazine.

LEEDS, a county of Upper Canada, bounded on the east by the county of Grenville, on the south by the river St. Lawrence, and on the west by the boundary line of the late township of Pittsburg, running north until it intersects the Ottawa or Grand river, and thence descending until it meets the north-westermost boundary of the county of Grenville. This county comprehends all the islands in the river St. Lawrence that are near it. The greater part of it lies fronting the St. Lawrence.—Also, a township in the county of Leeds, being the twelfth township in ascending the river St. Lawrence. It is watered by the Gananoque river, which has a good harbour at its entrance. There is a point of entry on the west bank of the Gananoque, near its mouth in the St. Lawrence.—Also, a town of America, in the eastern part of Gloucester county, New Jersey; 4 miles west of the mouth of Mullicus river.—Also, a town in Kennebeck county, on the east bank of Americkoggin river, opposite to the mouth of Twenty miles stream, in the town of Turner, in Cumberland county.—Also, a town, or

rather village, of Richmond county, Virginia, on the north bank of Rappahannock river; 70 miles N.E. of Richmond; near which is a famous course for horse-racing.

LEEDSTON, a post-town of Westmorland county, Virginia; 105 miles from Washington.

LEEGELLAN, a small island in the East Indian sea, near the east coast of Borneo. N. lat. 4° 10'. E. long. 118° 40'.

LEEHEEM, a small island nearly north-east of Borneo. N. lat. 6° 9'. E. long. 118° 16'.

LEEK, in *Botany, Gardening,* and the *Materia Medica.* See ALLIUM.

LEEK, in *Geography,* a small island of Pennsylvania, in Delaware river.

LEEK-Head, in the *Manege.* See WART.

LEEKE, or LEEK-in-the-Moorlands, formerly called Lee, in *Geography,* a market-town and parish in the hundred of Totmanlow, and county of Stafford, England, is seated at the northern extremity of that county, at the distance of 154 miles from London, and 31 from Manchester. Here are a weekly market on Wednesday, and seven annual fairs. In the year 1800, this parish contained 780 houses, and 3489 inhabitants. Many of them are employed in the manufacture of ribbons, silk-twist, and buttons; which may be considered the staple articles of the place. But of late years this latter branch has very much diminished, and at present the chief trade is in thrown silk, and the manufacture of bandana and other handkerchiefs. The cotton business has also been introduced, within these few years, into this town. The church here is a large building, with a lofty square tower. In the church-yard is an ancient stone-cross, the shaft of which is about ten feet in height. It has been called Danish, from "the imagery and fret-work," as Mr. Gough observes, with which it is ornamented. Near the town was formerly a Cistercian abbey, called Delacres, or Dieulacres, which was founded in the year 1214 by Ranulph, earl of Chester; to whom the lordship of this town formerly belonged. In the vicinity of Leeke are some lofty bare crags, called Leek-rocks and Henclouds. Blue-hills, in this neighbourhood, abound with coal-mines; and a fat-spring issues from one of these hills. Eight almshouses were endowed here in 1696, by Mrs. Elizabeth Aft, for as many widows.

LEER, in *Glass-making,* a sort of third furnace, intended to anneal and cool, by proper means, the vessels when made. See FURNACE and GLASS-HOUSE Furnace.

LEER, *Lebr,* or *Lier,* in *Geography,* a town of East Friesland, on a river of the same name, which soon after joins the Ems; 11 miles S. of Emden. N. lat. 53° 12'. E. long. 7° 20'.

LEERDAM, a town of Holland, on the river Linghe, which gave title of count to the noble house of Egmont, and afterwards to that of Nassau; 11 miles S. of Utrecht. N. lat. 51° 55'. E. long. 4° 59'.

LEERSIA, in *Botany,* a genus of grasses, received its appellation from Dr. Swartz, in order, with peculiar propriety, to honour the memory of John Daniel Leers, an apothecary at Herborn in Nassau, author of the *Flora Herbornensis*, published in 1775. This little octavo volume, now very rare, contains sixteen plates, in which all the grasses are engraved by the hand of the author, with such exquisite and minute precision, that they will bear inspection with a magnifier, almost like the plants themselves, and are unrivalled in natural history. A life of the author by his son is prefixed to this book, by which we learn that he died December 7, 1774, aged 47. The narrative contains few striking particulars, but the effusions of filial piety, with

which it abounds, must ever be interesting, and do honour both to the father and the son. A second edition of this work, from another hand, was published many years afterwards, of which the plates are extremely faulty and inaccurate copies of the first. Swartz. Prodr. 21. Ind. Occ. v. 1. 129. Schreb. 818. Willd. Sp. Pl. v. 1. 325. Mart. Mill. Dict. v. 3. Brown Prodr. Nov. Holl. v. 1. 210. Michaux Boreali-Amer. v. 1. 39. (Afprella; Schreb. 45. Homalocenchrus; Mieg. Act. Helvet. v. 4. 307. Hall. Helvet. v. 2. 201. Allion. Pedem. v. 2. 232. Ehrhartia; Wiggers Primit. 63.)—Clas and order, *Triandria Dignia*. Nat. Ord. *Gramina*, Linn. Juss.

Gen. Ch. Calyx none. Cor. Glume of two clofed, boat-shaped, concave, compressed flaves, often fringed with prickles at the back, and nearly equal in length; the outer one larger, oblong, pointed; inner but half as broad, linear, acute. Nectary of two lanceolate acute leaflets. *Stam.* Filaments three, in some cases one or fix, capillary, shorter than the corolla; anthers oblong. *Pist.* Germen superior, ovate, compressed; styles two, capillary, short; stigmas feathery. *Peric.* none except the permanent clofed corolla. *Seed* solitary, obovate, compressed.

Eff. Ch. Calyx none. Corolla of two clofed valves.

Obf. Homalocenchrus, the name given to this genus by Mieg, was jully, as compounded of another, thought exceptionable by Wiggers, who therefore preferred *Ehrhartia*; but the latter is now otherwise employed. (See *EHRHARTIA*.) Dr. Solander it seems originally distinguished this genus from *Phalaris*, and the name applied to it by Swartz, was adopted from his manuscripts. We cannot account for the error of Wiggers, who asserts it to be gynandrous, the stamens growing out of the top of the germen. We find no traces of any such insertion, which would be truly singular in a grass.

1. *L. oryzoides*. Swartz. Prodr. 21. Willd. n. 1. (*Phalaris oryzoides*; Linn. Sp. Pl. 81. Swartz. Obf. 31. Schreb. Gram. fasc. 2. 6. t. 22.—Panicle spreading. Flowers spreading, triandrous; their glumes fringed at the keel.—Native of watery places in Germany, France, Switzerland, Austria, Italy, and Persia. Seguer says it is frequent in the rice-fields about Verona, "in weeding which this grass is detected, in its youngest state, by its glaucous foliage, and, at a more advanced period, by the minute prickles at the edges of its leaves." The roughness arising from these prickles seems the origin of the Italian name, *Afprella*. The roots are perennial, with long runners. *Stems* four or five feet high, leafy, erect, smooth, with hairy joints. *Leaves* linear-lanceolate, pointed, striated, rough, especially at the edges, slightly glaucous; with long, striated, roughish sheaths; and a short notched stipula. *Panicle* at first enveloped in the upper sheath, then spreading, a span high, with numerous, drooping, compound, zigzag branches. *Flowers* light green, very much resembling those of rice, but smaller.

2. *L. virginica*. Willd. n. 2. (*L. oryzoides*; Michaux Boreali-Amer. v. 1. 39. *Oryza glumis carina hispida*; Gronov. Virgin. ed. 1. 153. *Phalaris oryzoides*; ed. 2. 11.)—Panicle loose. Flowers mostly triandrous, erect, close-pressed; their glumes fringed at the keel.—Found in Kentucky, Pennsylvania, and Carolina. Michaux. In marshes in Virginia, amongst *Smilacae* and *Rubi*, flowering in August. Clayton. Michaux thinks this is not specifically distinct from the former; but Willdenow, who has observed them both in a garden, says that, "though much alike, they are constantly different. The present has shorter and broader leaves; a shorter panicle, whose branches are not zigzag but

straight, and whose flowers are closely pressed to the stalks. The glumes are smaller, narrower, sparingly fringed. The panicle of this is never covered by a leaf, but always exposed and spreading." We have seen no specimen of this *Leersia*. Willdenow enquires "whether the Jamaica species be the same with it?" By this he seems to mean, whether *L. oryzoides* of Swartz, which he had already quoted with a doubt under the former, be this *L. virginica*. But Swartz no where mentions the *oryzoides* as a West Indian plant. He merely gives its character in italics, as usual in his *Prodromus*, to contrast it with his own new species, and thereby indicates it not to be a native of the West Indies.

3. *L. hexandra*. Willd. n. 4. Swartz. Ind. Occ. v. 1. 131.—Panicle nearly erect. Flowers alternate, close-pressed, hexandrous; their glumes fringed at the keel, roughish.—Native of watery places in the southern part of Jamaica, where it was gathered by Brown and Swartz. *Stem* two feet high, nearly erect, with hairy joints, but otherwise smooth, slender, leafy, sometimes a little branched. *Leaves* rather glaucous, lanceolate, acute, spreading, striated, rough at the edges. *Stipula* pointed, beardless. *Panicle* nearly erect, the branches a little spreading in every direction, by no means inclined to droop; the flowering part zigzag. *Flowers* alternate, crowded, erect, so as to approach the stalk, purplish, smaller than in *L. oryzoides*, but otherwise much like that species. The stamens however are constantly fix. It flowers in the spring.

4. *L. australis*. Brown Prodr. Nov. Holl. v. 1. 210.—Panicle loose, with alternate branches; the lower ones divided. Flowers hexandrous; their glumes fringed at the keel, finely toothed at their ribs; smooth at the sides.—Gathered by Mr. R. Brown at Port Jackson, as well as in the tropical part of New Holland. He thinks it to near the last, as to be doubtful of their being distinct.

5. *L. lenticularis*. Michaux Boreali-Amer. v. 1. 39.—Branches of the panicle nearly solitary, their secondary divisions spiked. Flowers imbricated; their glumes orbicular, fringed. Native of marshes in the country of the Illinois. Michaux describes the glumes as rather large, lenticular, and conspicuously fringed.

6. *L. monandra*. Willd. n. 3. Swartz. Ind. Occ. v. 1. 130.—Panicle simple, loose. Spikes remote, lax. Flowers monandrous, somewhat imbricated, single-ranked; their glumes roundish, smooth.—Observed by Swartz in chalky groves in Jamaica, flowering in the spring. He describes it as very different from all the other species known to him. The stem is two or three feet high. Leaves long, upright and smooth, of a bright green. Flowers the size of Millet-seed, green, smooth, with only one flamen in each.

LEERSIA, H. dw. Fund. v. 2. 88. See ENCALYPTA.

LEERSTRAND, in Geography, a town of Norway; eight miles S.W. of Drontheim.

LEES, the grossest and thickest parts of wine, oil, and other liquors; or the sediment found at the bottom of the vessel. See LIXIVUM.

The word comes from the French *lie*, and that either from *limus, mud*, or from *Lycus*, one of the surnames of Bacchus; or, according to Du-Cange, from *lia*, a corrupt Latin word, signifying the fame.

A kind of potash, called *cineres clavellati*, is made with the lees of wine burnt, and prepared, used by dyers, &c. which ought to be remembered by people troubled with the stone, &c.

The vinegar-makers make a great trade of the lees of wine dried, and made into cakes, after having squeezed out the remains of the liquor in presses.

All the various kinds of lees, such as those of wine, beer, ale, oil, &c. may be made use of as manures, when they can be had in sufficient quantities for the purpose.

**LEESBURG**, in *Geography*, a post-town of Maryland, in America; 25 miles from Fredericktown.—Also, a post-town of Virginia, and the capital of Loudon county; situated six miles S.W. of the Patowmac, and containing about 60 houses, a court-house, and gaol; 20 miles from Salisbury.

**LEESNITZ**, or **LEGNICA**, a town of Silesia, in the principality of Oppeln; 18 miles S.S.E. of Oppeln.

**LEET, JAMES**, in *Biography*, was born at Geneva in 1560. He received the early part of his education at home; studied law under Cujas, and, through the influence of Beza, obtained a chair in that faculty at Geneva in 1583. In the following year he was made counsellor of state, and the zeal and intelligence which he displayed in the public service caused him four times to be appointed to the syndicate, or first office in government, and likewise to be employed in important negotiations; one of which was with Elizabeth, queen of England, in order to obtain some pecuniary aid for the republic. He was employed upon a similar mission to Holland, and obtained a sum from the prince of Orange, and the states general, upon the condition that the academy of Geneva should be re-established. Leet supported this measure, and delivered an oration "De studiis liberalibus publica ob mala non defendis." He was employed to defend the rights of the republic with his pen against the duke of Savoy; and he vindicated the Protestant religion in opposition to the attacks of the president Favre. He was author of various publications in jurisprudence, and in polite literature. He died in 1611, highly respected by his countrymen as the model of a good citizen and magistrate. His principal works are, "Thefaurus Juris Romani, continens rariora meliorum Interpretum Opuscula;" five vols. folio. His other publications consist chiefly of poems, orations, pieces of biography, &c. Gen. Biog.

**LEET**, *Letas*, (*letb*, *letbe*, *letbe*), is a term of Saxon original, and seems to be no other than the court of the *letbe*; as the county court is the court of the county. For in ancient times the counties were sub-divided into *letbes*, rapes, wapentakes, hundreds, and the like; and the sheriff twice a year performed his *tourn* or perambulation, for the execution of justice through the county. Afterwards the power of holding courts was granted to divers great men, within certain districts. And from hence, these courts, holden within particular parts of the county, have descended unto us without variation, under the name of the *leet*, *letb*, or *letbe* courts. See *COURT-leet*, and *FRANK-pledge*.

**LEETAKOO**, in *Geography*, a large and populous city of Africa, the capital of a tribe of Kaffers called "Boo-hoanans," and the residence of their chief, situated at the distance of 16 days' journey beyond the Orange river in the direction of N.E. from the Cape of Good Hope. The palace of the chief, like the other houses in the town, was built in a circular form, being about 16 feet in diameter. The lower part, to the height of four feet from the ground, was stone laid in clay, and wooden spars erected at certain distances. On the east side of the circle, about the fourth part of the house was open, the other three-fourths entirely closed. A round pointed roof covered the whole in the form of a tent, well thatched with long reeds, or with the straws of the holcus. From the centre to the back part of the house, a circular apartment is made off, with a narrow entrance into it, where the head of the family takes his nightly rest; the other members of the family sleep in the fore part,

or between the large and small circles of the house. All the houses are enclosed with palisades; and the space between these and the dwelling serves for a granary, and store for their grain and pulc. These granaries are constructed in the form of oil-jars, of baked clay, the capacity of each being in the least 200 gallons; and they are supported on tripods, composed of the same material, which raise them about nine inches above the ground. They are covered with a round straw roof erected on poles, and sufficiently high to admit an opening into the jars, the upper edges of which are from five to six feet from the ground. Within and without the town are plantations of that species of Mimosa, which constitutes the principal food of the camelpardalis. The city in its circumference is estimated as large as Cape Town, with all the gardens of Table valley; but it is impossible to ascertain the number of houses, by a general survey, on account of the irregularity of the streets, and lowness of the buildings; but they are supposed to amount to between two and three thousand, of the same kind, but not so large, as that of the chief. The whole population, including men, women, and children, were estimated at between ten and fifteen thousand persons. The situation of Leetakoo was calculated to be S. lat. 26° 30', and E. long. 27°.

**LEEUWE**, or **LEEUWEN**, a town of France, in the department of the Dyle, called by the Flemings "Sout. Leeuwe," situated on the river Geeta, in the midst of a morass; formerly a place of strength, to which persons condemned to banishment were sent; 20 miles W.N.W. of Liege.

**LEEUWARD ISLANDS**, so called in contradistinction to the *Windward islands*, an appellation given to them from their situation in a voyage from the ports of Spain to Carthage, or Porto Bello. Those that lie to leeward extend from Porto Rico to Dominica.

**LEFCA**, a town of the island of Cyprus, the residence of an aga and a cadî. It was one of the four cities that bore the name of Arsinœ; 28 miles N.E. of Bassa.

**LEFKEH**, a town of Asiatic Turkey, in the province of Natolia; near it is a convent, which is the residence of a Greek bishop; 16 miles S.E. of Iznik.

**LEFOOGA**, one of the Friendly islands in the South sea, near Hapææ; in reality forming with three other islands, *viz.* Haanno, Foa, and Hoolava, a group, distinguished by the general name Hapææ. Each is about six or seven miles long, and of a similar height and appearance. Lefooga is joined by a reef to Foa. Lefooga is in several respects superior to Annamooka; its plantations were more numerous and more extensive. Towards the sea, indeed, on the east side, the country is still waste, which is probably owing to its sandy soil, as it is much lower than Annamooka and its surrounding isles. Towards the middle of the island the soil was better, and here were exhibited conspicuous marks of considerable population, and improved cultivation. The plantations were regularly fenced, and the fences, in a manner running parallel to each other, formed spacious public roads, not only convenient but ornamental. Large spots were covered with the paper mulberry trees, and the plantations were generally stocked with such roots and fruits as are the natural produce of the island. At one place was a house, four or five times as large as those of the common sort, to which, it is supposed, the people resort on certain public occasions. Near the landing place was observed a mount, two or three feet high, covered with gravel; and upon it stood four or five small huts, in which, as the natives said, the bodies of some of their principal people had been interred. This island is not above seven miles long; and, in  
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some places, not above two or three broad. The reef on the east side, considerably broad, and on which the sea breaks with great violence, is a continuation of that which joins Lefooga to Foa, not above half a mile distant; and at low water, the natives can walk on this reef, which is then partly dry, from one island to the other. The shore itself is either a coral rock, six or seven feet high, or a sandy beach; but higher than the wet side, which is not, in general, more than three or four feet from the level of the sea, with a sandy beach through its whole length. S. lat. 19° 47'. E. long. 185° 40'.

LETT, a town on the N. coast of the island of Kishma; 12 miles N.E. of Kishma.

LEG, CRUS, in *Anatomy*. See EXTREMITIES.

LEG, *Amputation of*, in *Surgery*. See AMPUTATION.

LEG, *Dislocations of*. See LUXATION.

LEG, *Fractions of*. See FRACTURE.

LEG, *Mortification of*. See GANGRENE.

LEGACY, LEGATUM, in the *Civil Law*, a donation by testament; answering to what in common law is called a *donative*; and the person to whom it is given is styled the *legatee*.

Legacy is usually defined some particular thing given by a last will and testament; because if a man thus dispose, or transfer his whole estate to another, it is called *hereditas*; and he to whom it is given is called *heres*. Though in common law, the distinction is this: that he to whom all a man's lands and hereditaments descend by right of blood, is *heres natus*; the other, to whom it is bequeathed, is called *heres factus*.

This bequest transfers an inchoate property to the legatee; but the legacy is not perfect without the assent of the executor; for if I have a *general or pecuniary* legacy of 100*l.*, or a *specific* one of a piece of plate, I cannot in either case take it without the consent of the executor. (Co. Litt. 111. Aley. 39.) For all the chattels are vested in him; and it is his business first of all to see whether there is a sufficient fund left to pay the debts of the testator; the rule of equity being, that a man must be just before he is permitted to be generous, or, as Bracton expresses the sense of our ancient law, "de bonis defuncti primo deducenda sunt ea que sunt necessitatis, et postea que sunt utilitatis, et ultimo que sunt voluntatis." In case of a deficiency of assets, all the general legacies must abate in due proportion to pay the debts; but a specific legacy, as of a piece of plate, a horse, or the like, is not at all to abate, unless there be not sufficient without it. A specific legacy is where, by the assent of the executor, the property of the legacy will vest. As in one way there is a benefit to a specific legatee, that he shall not contribute, in case of a deficiency, to pay all the legacies, so there is a hazard in another way: *e. g.* if such specific legacy, being a *lease*, be evicted; or being *goods*, be lost or burnt; or, being a *debt*, be lost by the insolvency of the debtor; in all these cases, such specific legatee shall have no contribution from the other legatees, and therefore shall pay none towards them. (1 P. Wms. 539.) Hence a question of some importance has arisen, *viz.* whether a legacy was *specific* or *general*? A specific legacy (strictly speaking) is said by lord Hardwicke (1 Atk. 417.) to be a bequest of a particular chattel, *specifically* described and distinguished from all other things of the same kind; or, in other words, an *individual* legacy. Money, sufficiently distinguished, may be the subject of a specific bequest; as money in a certain chest, or a particular debt. So a bequest of a part of a specific chattel may be equally a specific legacy. (3 Atk. 103.) Legatees, however, of specific parts, though not liable to abatement with *general* le-

gates, must nevertheless abate proportionably among themselves, upon deficiency of the specific thing bequeathed (2 Vez. 563.); or on deficiency of the general assets for payment of debts. (1 P. Wms. 403.) And specific legatees of distinct chattels shall abate proportionably on a deficiency of general assets. 2 P. Wms. 382.

On the other hand, a mere bequest of *quantity*, whether of money or any other chattel, is a *general* legacy; as of a quantity of stock (1 Atk. 414. 2 Vez. 562.); and where the testator has not such stock at his death, it is a direction to the executor to procure so much stock for the legatee. (Tabl. 227.) The purpose to which a *general* legacy is to be applied will not alter its nature. (1 P. Wms. 539.) Personal annuities given by will are general legacies. 3 Atk. 693. 2 Vez. 417. See EXECUTOR and LEGATEE.

With regard to the payment of legacies, if a legacy when due be paid to the father of an infant, it is no good payment: and the executor may be obliged in equity to pay it again; and where any legacy is bequeathed to a *feme-covert*, paying it to her alone is not sufficient, without her husband. 1 Vern. 261.

Executors are not bound to pay a legacy without security to refund; and if sentence be given for a legacy in the ecclesiastical court, a prohibition lies, unless they take security to refund. (2 Ventr. 358.) As an executor is not obliged to pay a legacy without security given him by the legatee to refund, if there are debts, because the legacy is not due till the debts are paid, and a man must be just before he is charitable; so in some cases, the executor may be compelled to give security to the legatee for the payment of his legacy; as where a testator bequeathed 100*l.* to a person, to be paid at the age of 21, and appointed an executor, and died; afterwards the legatee exhibited a bill in equity against the executor, setting forth that he had wasted the estate, and praying that he might give security to pay the legacy when it should become due; and it was ordered accordingly. 1 Ch. Rep. 136. 257.

If a legacy is devised, and no certain time of payment is fixed, and the legatee is an infant, he shall have interest for the legacy from the expiration of one year after the testator's death; but if the legatee be of full age, he shall have no interest but from the time of the demand of his legacy. Where a legacy is payable at a day certain, it must be paid with interest from that day. (2 Salk. 415. 2 Nelf. Abr. 1114.) (See *Lapsed* LEGACY, and INTEREST on LEGACIES.) It has been decreed in equity, that although a legacy be devised to be paid at a certain time, it carries interest only from such time as it is demanded. A person having a legacy, of which he was unapprized till a great while afterwards, when the executors published it in the gazette; here chancery would allow no interest, but the bare debt. Pr. Chanc. 11.

As legacies are gratuities, and no duties, action will not lie at common law for the recovery of a legacy; but remedy must be had in the chancery or spiritual court. (Allen. 38.) If a legacy is payable out of the land, or its profits, an action on the case lies at common law; but the usual remedy is in chancery. (Sid. 44. 3 Salk. 223.) By chief justice Holt, a legatee may maintain an action of debt at common law, against the owner of land, out of which the legacy is to be paid; and since the statute of Wills gives him a right by consequence he shall have an action at law to recover it. (2 Salk. 415.) It is now, however, positively determined, that no action at law lies for a legacy; the court of chancery being the proper jurisdiction for that purpose. (5 Term Rep. 690.) An executor being in equity considered as a trustee for the legatee, with respect to his legacy, and as a

trustee in certain cases for the next of kin as to the undivided surplus, we hence derive the true ground of equitable jurisdiction in enforcing the payment of a legacy, or distribution of personal estate. (1 P. Wms. 544, 575.) The spiritual court administers redress in the case of subtraction, or the withholding or detaining of legacies, as a consequential part of their testamentary jurisdiction; but in this case the courts of equity exercise a concurrent jurisdiction, as incident to some other species of relief required; and as it is beneath the dignity of the king's courts to be merely auxiliary to other inferior jurisdictions, the cause, when once brought there, receives there also its full determination. Blackit. Com. b. iii.

Where a testator gives his debtor a legacy greater than his debt, it shall be taken in satisfaction of it; though where the legacy is less, it shall not be deemed as any part thereof; but as a legacy is a gift, the legatee has sometimes decreed both. (1 Salk. 155. 2 Salk. 508.) If a greater legacy is given by a codicil, to the same person that was legatee in the will, it shall not be a satisfaction, unless expressed. (1 P. Wms. 424.) Although a legacy is a gift, yet upon a principle already stated, that a man should be just before he is kind, a bequest of the same sum by the debtor to the creditor, shall be applied in satisfaction of the debt. (Pr. Ch. 394. 2 P. Wms. 130. 3 P. Wms. 354. 1 Ves. 123. 4 P. Wms. 616.) Yet when there are legatees, and the testator intended both, it may be as good equity to consider him as both just and kind; and the construction of making a gift a satisfaction has, in many cases, been carried too far. (1 Salk. 155. 4 P. Wms. 410. 2 P. Wms. 616.) Cases of this nature depend upon circumstances; and where a legacy has been decreed to go in satisfaction of a debt, it must be grounded upon some evidence, or at least a strong presumption that the testator did so intend it; for a court of equity ought not to hinder a man from disposing of his own as he pleases; and therefore the intention of the party is to be the rule; for where he says he gives a legacy, the court cannot contradict him, and say he pays a debt. (Treat. Eq. lib. 4. p. 1. c. 1. §. 5.) Jacob's Law Dict. by Tomlins, tit. Legacy. See WILL.

LEGACY, *Contingent*. See CONTINGENT.

LEGACIES, *Interest on*. See INTEREST.

LEGACY, *Lapsed*, is where the legatee dies before the testator, in which case the legacy shall sink into the residuum. (See CONTINGENT.) A legacy to be paid, when he attains the age of 21 years, is a *vested* legacy; an interest which commences in *presenti*, although it be *subdumum in futuro*; and if the legatee dies before that age, his representatives shall receive it out of the testator's personal estate, at the same time it would have become payable, in case the legatee had lived. But if such legacies be charged upon a real estate, they shall lapse for the benefit of the heir; for in regard to devises affecting lands, the ecclesiastical court hath no concurrent jurisdiction with chancery. And yet where 1000*l.* was given by a person out of lands to his daughter, and interest to be computed from his death, &c. here, though the legatee died before the time appointed for paying the same, it was held the legacy should be raised notwithstanding, and the lord chancellor said that this legacy was a vested one. (2 Vern. Rep. 617. Barnardist. 328. 330.) In case of a vested legacy, due immediately, and charged on land, or money in the funds, which yield an immediate profit, interest shall be payable thereon from the testator's death. See INTEREST on Legacies, and LEGATEE.

LEGACIES, *Subtraction of*. See SUBTRACTION.

LEGACY, in an *Ecclesiastical Sense*, was a soul-seat, a bequest to the church, or accustomed mortuary; which was

to hold good, even though the testament itself were declared null and invalid.

LEGAL *Column*, (*Economy*, *Subrogation*, and *Tutorage*. See the several substantives.

LEGALIS, *Homio*, in *Law*, a person who stands *relatus in curia*, not outlawed, nor excommunicated, nor infamous. And in this sense are those words so often used, *probi et legales homines*.

Hence, also, legality is taken for the condition of such a man.

LEGATA, fem. LEGATE, plu. in *Musiv*. See NOTES and SYNCOPATION.

LEGATE, a prelate, whom the pope sends as ambassador to any sovereign prince.

The term legate comes from *legatus*, which Varro derives from *legere*, to *choose*; and others from *legare*, *delegare*, to *send*, or *delegate*. Wicquefort.

There are three kinds of legates; *viz.* legates *a latere*, legates *de latere*, and legates *by office*, or *legati nati*.

Of these, the most considerable are the legates *a latere*; such are those whom the pope commissions to take his place in councils; who are thus called, because the pope never gives this office to any but his greatest favourites and confidants, who are always at his side, *a latere*; that is, to the cardinals.

A legate *a latere* may confer benefices without mandate, legitimate bastards to hold offices, and has a cross carried before him as the ensign of his authority.

The legates *de latere* are those who, not being cardinals, are yet entrusted with an apostolical legation.

LEGATES *by office*, *legati nati*, are those who have not any particular legation given them; but who, by virtue of their dignity, and place in the church, become legates. Such are the archbishop of Rheims and Arles. But the authority of these legates is much inferior to that of the legates *a latere*. The power of a legate is sometimes also given without the title; some of the nuncios are invested with it.

LEGATE, *Court of the*. See COURT.

LEGATEE, or LEGATARY, in *Law*, the person to whom a legacy is left; which every person is capable of being, unless particularly disabled by the common law or statutes, as traitors, and some others.

Formerly Papists were under several disabilities, both as to purchasing lands, and taking them by descent or devise; but in these more liberal and enlightened times, such disabilities are removed, and Papists, or as we should rather call them, Roman Catholics, are rendered capable of purchasing and devising lands, and having them by descent, purchase, and devise, on taking the oath prescribed to them by 18 Geo. III. c. 60.

It seems to be necessary that a legatee should be born at the time of making the will; and it has been adjudged, where legacies were given to a man's children, that those who were born afterwards should have no share. (1 Bull. 153.) But it has been otherwise decreed in chancery. (1 Ch. Rep. 301.) The general rule with regard to legatees is, that if the legatee die before the testator, or before the condition upon which the legacy is given be performed, or before it be vested in interest, the legacy is extinguished. (Treat. Eq. lib. 4. part 1. c. 2.) But a bequest may be so specially framed as to prevent the death of the legatee from occasioning a lapse of the legacy. (3 Atk. 572. 500.) Nor will the rule extend to a legacy bequeathed to two or more; for though, by the civil law, there is no survivorship among legatees, yet it is settled that a legacy to two or more is not extinguished by the death of one, but will vest in the survivor. (Gilb. Rep. 137. 2 Atk. 220.) Nor will

the rule extend to those cases where the legacy is given over after the death of the first legatee; for in such cases the legatee in remainder shall have it immediately. (1 And. 33, pl. 82. 2 Vern. 207. 1 P. Wms. 274. 3 P. Wms. 113. Pr. Ch. 37. Mofch. 319. 2 Vern. 378.) Nor will a legacy lapse by the death of the legatee in the testator's life-time, if he be to take as a trustee; (See 1 Vez. 140; and 2 Vern. 468.) in which latter case the point is doubted. When a father makes provision for a child by his will, and afterwards gives to such child, being a daughter, a portion in marriage; or, being a son, a sum of money to establish him in life, (such portion or sum being in amount equal to, or greater than, the legacy,) it is an implied adoption of the legacy; for the law will not intend that the father designed two portions to one child. (1 P. Wms. 680. 2 Ch. Rep. 85. 2 Vern. 115. 257. 2 Atk. 216. Ambl. 325. 2 Bro. C. R. 307.) But this implication will not arise, if the provision by the will be by bequest of the residue (2 Atk. 216.); or if the provision in the father's life-time be subject to a contingency (2 Atk. 491.), or be not *eiusdem generis* with the legacy (1 Bro. C. R. 425.); or if the testator be a stranger (2 Atk. 516. 2 Bro. C. R. 499.); and such implication is always liable to be refuted by evidence. 2 Atk. 516. 2 Bro. C. R. 165. 519.

A bequest of money to one at the age of 21, or day of marriage, without saying, *to be paid* at that time, the legatee dying before the term, is a lapsed legacy; and so it would have been, if the devise had been to her when she shall marry, or when a son shall come of age, and she die before. (Godb. 182. 2 Vent. 342.) But a devise of a sum of money, *to be paid* at the day of marriage, or age of 21 years, if the legatee die before either of these events happen, shall go to the legatee's administrator, because the legatee had a present interest, though the time of payment was not yet come; and it is a charge on the personal estate which was in being at the testator's death; and if it were discharged by this accident, then it would be for the benefit of the executor, which was never intended by the testator. (2 Vent. 366. 2 Lev. 207.) If the legacy be to the legatee *payable to him* at a certain age, and the legatee die before he attain that age, this is a vested and transferrable interest in the legatee. (2 Vent. 342. 2 Ch. Car. 155. 3 Vern. 462. 3 P. Wms. 138. 2 Vern. 199.) Otherwise, if the legacy be to the legatee generally, at or when he attains such age. (2 Vent. 342. 2 Salk. 415. 1 Eq. Ab. 259, 6. 1 Bro. C. R. 119.) If the legacy be made to carry interest, though the words *to be paid* or *payable* are omitted, it is a vested and transferrable interest. (2 Vent. 342. 2 Ch. Car. 155. 2 Vern. 673. 2 Vez. 263. 3 Atk. 645.) So if the bequest be to A. for life, and after the death of A. to B., the bequest to B. is vested upon the death of the testator, and will not lapse by the death of B. in the life-time of A. (2 Vent. 347. 1 P. Wms. 566. 2 Vern. 378. Ambl. 167. 1 Bro. C. R. 119. 181.) A person by will, &c. gives a portion or legacy to a child, payable at 21 years of age, out of a real and personal estate, and the child dies before the legacy becomes payable; in that case, so much of it as the personal estate will pay, shall go to the child's executors and administrators; but so far as the legacy is charged upon the land, it is said that it shall sink. (2 P. Wms. 613.) Jacob's Law Dict. by Tomlins, vol. ii. See LEGACY and EXECUTOR.

LEGATEE, *Residuary*, is the person to whom the residuum, or what remains of an estate, after funeral charges, debts, and legacies, are paid, is left by will. See EXECUTOR.

LEGATINE CONSTITUTIONS. See CONSTITUTIONS.

LEGATIS TENEMENTIS. See TENEMENTS.

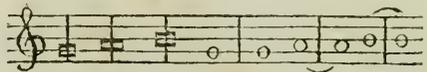
LEGATO, *Ital.*, in *Musick*, bound, tied, connected, sustained.

LEGATORY, or LEGATARY, a term used in speaking of the government of the ancient Romans: Augustus divided the provinces of the empire into consular, legatory, and provincial. The legatory provinces were those of which the emperor himself was governor, but where he did not reside, but administered affairs by his lieutenant, or legatus.

LEGATORY, or *Legatory*, the same with legatee of a will. (27 Eliz. cap. 16.) It is derived from the Latin *legatarius*.

LEGATUM, in an *Ecclesiastical Sense*, was a legacy given to the church, or accoutumed mortuary.

LEGATURA, *Ital.*, in *Modern Musick*, implies a binding note; as when the bar goes through the middle of the note, or two notes of the same kind are tied together by a femicircle.



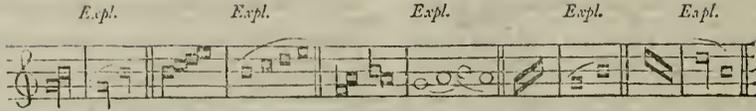
The bar is seldom drawn through the head of the note, except in *alla breve* time: notes of less value are linked together by a femicircle, or tie. See SYNCOPATION.



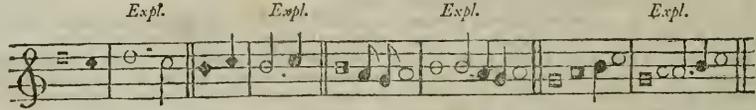
In old church music, before the use of bars, and when the notes were chiefly square, such as the *large*, the *long*, and the *breve*, the laws of ligature constituted the most difficult and tedious part of a practical musician's study. The value or length of a note, in the fifteenth or sixteenth centuries, was changed, by the position of the tail being upwards or downwards, on the left or right side of a note, or in the middle of a measure. In the music-school at Oxford, a set of mass books is preserved, containing compositions by Dr. Fairfax, Taverner, and other old English masters, of Henry VII.'s and Henry VIII.'s time, that are totally unintelligible, except to very curious and studious professors, who have made the ligatures their peculiar study.

Ligatures were used by the early contrapuntists, in vocal music, to connect such sounds as were to be sustained or sung to one syllable, as is done at present by femicircular marks, called binding-notes, and flurs. The rules for these are too numerous and vague to be explained without a long discussion, and their powers will perhaps be best comprehended in the examples of ancient composition of different parts, in partition, and barred. However, it may be useful to those who undertake to decypher such music, to remember that all the square notes in ligature, with tails on the *right hand*, *descending*, are long; on the *left*, *breves*; and all with tails on the *left*, *ascending*, are femibreves. Square notes, without tails, in ligature, are in general breves, though there are some exceptions to this rule, for which it is not easy to assign a cause.

Ligatures explained by equivalent Notes.



Black, square, and lozenge notes, when mixed with white, are diminished one-fourth of the value they have, while open or vacuete. And a note partially black, or demivacuete, is struck twice, in the following proportions :



LEGATUS, among the Romans, a military officer, who commanded as deputy of the chief general.

Of these there were divers kinds; *viz.* a legatus in the army under the emperor, or general, answering to our lieutenant-general; and a legatus in the provinces, under the proconsul, or governor.

When any considerable person among the Roman citizens had occasion to pass through any of the provinces, the senate gave him the title of legatus; that is, of envoy from the senate, to the end that he might be received with the greater respect, and that the cities and towns, through which he travelled, might defray his expences. This they called a *free legation, libera legatio*; because the person was not incumbered with any trust, and might lay it aside as soon as he pleased.

LEGAU, in *Geography*, a town of Bavaria, belonging to the abbey of Kempten; 2 miles N.N.W. of Kempten.

LEGE, a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Nantes; 21 miles S. of Nantes. The place contains 2893, and the canton 5227 inhabitants, on a territory of 167½ kilometres, in 5 communes.

LEGEM, *ad communem, entry*, in *Law*, a writ of entry which lies where tenant for term of life, or for term of another's life, or by courtesy, &c. aliens and dies, when he in the reversion shall have his writ against any one that is in possession of the land. New Nat. Brev. 461. See ENTRY.

LEGEM *facere*, to make law, or oath; and *legem habere*, is to be capable of giving evidence upon oath. "Minor non habet legem." Selden's Notes on Heng. 133.

LEGEND, LEGENDA, was originally a book used in the old Romish churches, containing the lessons that were to be read in divine service.

Hence also the lives of saints and martyrs came to be called legends; because the chapters were read out of them at matins, and in the refectories of the religious houses.

The first Greek legend which is known is that of Simon Metaphrastes of the tenth century, who writ the lives of saints adapted to every day of the year. The first Latin legend is,

LEGEND, *Golden*, or a collection of the lives of the saints, compiled by James de Varase, better known by his Latin name of J de Voragine, vicar-general of the Dominicans, and afterwards archbishop of Genoa, who died in 1298.

It was received into the church with great applause, which it maintained for two hundred years; but, in effect, it

is so full of ridiculous and romantic accounts, that the Romans themselves are now generally ashamed of it. The word legend itself is, on that account, come into disrepute.

LEGEND is also used by authors to signify the words or letters engraven about the margins, &c. of coins.

Thus, the legend of a French crown is, SIT NOMIN DOMINI BENEDICTVM; that of a moidore, IN HOC SIGNO VINCES; on those of the last emperors of Constantinople, we find IESVS CHRISTVS BASILEVS BASILEON, HIS XPS NICA, IESVS CHRISTVS VINCIIT. For a brief historical account of the legend on coins, and the method of engraving it; see the article COINAGE.

LEGEND is also applied to the inscription of medals, which serve to explain the figures or devices thereof.

In strictness, the legend differs from the inscription; this last properly signifying words placed on the reverse of a medal, in lieu of figures. When the letters or words of a medal occupy the field, they are called an *inscription*; but when they run round the margin, on either side of the figures, or on the exergue, they are denominated a *legend*.

It seems as if the ancients had intended their medals should serve both as images, and as emblems: the one for the common people, and the other for persons of taste and parts; the images to represent the faces of princes; and emblems to represent their virtues, and great actions: so that the legend is to be looked on as the soul of the medal, and the figures as the body.

Every medal has properly two legends; that on the front, and that on the reverse. The first generally serves only to distinguish the person by his name, titles, offices, &c.; the latter is intended to express his noble and virtuous sentiments, his good deed; and the advantages the public has reaped by him. This, however, does not hold universally; for sometimes we find the titles shared between both sides, and sometimes also the legend.

In the medals of cities and provinces, as the head is usually the genius of the place, or, at least, some deity adored there, the legend is the name of the city, province, or deity, or of both together; and the reverse is some symbol of the city, &c. frequently without a legend; sometimes with that of one of its magistrates.

The ordinary subjects of legends are, the virtues of princes, the honours they have received, consecrations, signal events, public monuments, deities, public vows, privileges, &c.

Legends and inscriptions of medals are either in Latin or Greek. The Greek character, consisting of majuscule, or capital

capital letters, appears uniform on all the medals; no change or alteration being found in confronting the several characters; though it is certain there was in the ordinary use and pronunciation. All we observe on medals is sometimes a mixture of Greek and Latin letters.

Upon many of the coins struck in the Greek cities, we find the legend of the obverse in Latin, while that of the reverse is in Greek. The reason of this, suggested by Mr. Pinkerton, seems to be, that the magistrate of such country mint, not having any portrait of the emperor, sent to Rome for one, which was returned in a die ready cut with the legend. To this a reverse was made by the Greek artists; the magistrate inclining to save the expence of cutting another obverse. This opinion is confirmed by the fact, that few or no coins occur with Latin legends on the reverse, and Greek in front: besides, the dies are hastily done, and after the manner of different mints.

The character was preserved in all its beauty till the time of Gallienus.

From the time of Constantine, and for the space of five hundred years, the Latin tongue was alone used in the legends of medals, even in those struck at Constantinople. Michael began the first, whose legend was in Greek; and from his time the language, as well as the characters, began to alter for the worse. See MEDAL.

The Latin legends are all read from the left to the right; but the legends of some Greek medals are wrote the contrary way, from the right to the left. The letters of the circular legends are commonly placed with the bottoms inward; but sometimes with the bottoms towards the edge.

It is observed by Mr. Pinkerton in his excellent "Essay on Medals," that the legends of the earliest Greek writers are very brief, rehearsing only the initials of the city or prince: as  $\text{A}\Theta\text{E}$ , money of Athens;  $\text{C}\text{T}$ , money of Sybafis, &c.: afterwards,  $\text{A}$ , money of Archelaus, king of Macedon;  $\Phi$ , money of Philip. Afterwards the name was put at full length; as  $\text{O}\Lambda\text{I}\text{M}\text{P}\text{I}\text{O}\text{R}$ , coin of Philip of Macedon; and Alexander the Great has the title of  $\text{B}\alpha\text{S}\text{I}\Lambda\text{E}\text{T}\text{E}$ , or king. In process of time, the Syrian and Egyptian kings, the successors of Alexander, added some epithet of praise, as  $\text{E}\text{Y}\text{E}\text{P}\text{H}\text{E}\text{T}\text{I}\text{E}$ , beneficent, or the like, together with the year of their era in which the coin was struck. In this state the Greek coinage remained, till the Roman empire swallowed up all the kingdoms and cities which used that language. "Under the dominion of the Roman emperors, the Greek mint assumed more of the Roman form, then more perfect, as to legend, than their own. On the face they gave the Roman emperor or empress, with their titles; the founder of their city, with his name; the senate or the people of Rome, who had protected them; or the ideal bust of the genius of their city: while the reverse presents us with a legend indicative of the name of the magistrate under whom the money was struck; of some treaty entered into with one or more neighbouring states; of the river or deity represented, and the like." The Greek artists, as the same ingenious writer observes, to their honour, even when their mint was depressed by the Roman power, seldom or never explain by their legends the reverses of their coins; commonly, and almost universally, putting for the legend of the reverse the name of the city, frequently adding that of the magistrate. The symbols of their deities were familiar, and needed no explanatory legend. Personifications, rare on Greek coins, except of their cities and rivers, are commonly accompanied by an illustrative legend; and the Egyptian coins have also similar legends. The Grecian coins of cities seldom express more in their legends than the name of the town, generally contracted till the Roman

times. When the Roman empire swallowed up the Grecian, the legends on Greek coins were as much distinguished by their length as they had before been by their brevity. The titles of the emperors are translated from the Latin as literally as possible, as  $\text{A}\text{T}\text{T}\text{O}\text{K}\text{P}\text{A}\text{T}\text{O}\text{P}$  for Imperator,  $\text{K}\alpha\text{I}\text{C}\alpha\text{E}\text{A}\text{P}$  for Cæsar, &c. In order to express Latin sounds, the Greeks were often obliged to put their own enunciation of the same word, in characters very different from the Latin, as  $\text{K}\text{O}\text{I}\text{N}\text{O}\text{N}$  for Quintus. On the reverses of Greek imperial coins, the legends are very various; such are  $\text{K}\text{O}\text{I}\text{N}\text{O}\text{N}$ , the community;  $\text{O}\text{M}\text{O}\text{N}\text{O}\text{I}\text{A}$ , the alliance;  $\text{A}\text{T}\text{T}\text{O}\text{N}\text{O}\text{M}\text{O}\text{I}$ , living by their own laws;  $\text{L}\alpha\text{E}\gamma\text{G}\epsilon\text{O}\text{I}$ , free, &c. Inscriptions filling the whole field of the reverse are not so common in Greek coins. Some few, however, occur, particularly upon those of Smyrna. Our author further observes, that the noted S. C., signifying *Senatus Consulto*, by decree of the senate, and expressing the authority of the senate of Rome for striking any coin, never appears upon those of gold or silver, in the same sense as when it occurs upon those of brass. He suggests, that the Roman emperors had the sole disposal of the gold and silver coinage, but left that of brass entirely to the senate. The Roman legends resembled, for some time, in their simplicity those of the Greeks; but gradually proceeded to more explicit length, and in time from elegant and simple veracity degenerated into flattery. This remark is strictly applicable to the legends of the obverse; whereas those of the reverse began to flatter as soon as there was a prince, "an idol upon whose altar to burn the cloudy perfume." Clemency and moderation are found upon the medals of Tiberius, and equivalent virtues upon those of Titus. The reverses of the first imperial coins are not, however, wanting in adulation; which, says Mr. Pinkerton, is not to be wondered at, "when we consider that Virgil and Horace, men of the most enlightened minds, whatever may be decided of their claim to genius, were yet capable of even forgetting the sound dignity of poetry, and prostituting it at the bloody footstool of a tyrant. What Montfiquieu says of the English, that if ever they were reduced to be slaves, they would prove the meanest of all slaves, was exemplified in the conduct of the ancient Romans." In process of time, "a succession of virtuous monarchs authorized the reverses so foreign to most of their predecessors. S. P. Q. R. OPTIMO PRINCIPI, so common on the coins of Trajan, is not flattery, but glory. All the virtues appear without impropriety on the medals of Nerva, Trajan, Hadrian, and the Antonini. But in proportion as the empire declined, the more common are flattery and gross impropriety in the legends of the Roman coin." The Greeks also even surpassed the Romans themselves in the base art of adulation. "The legends of the Roman imperial coins are deservedly celebrated for their beautiful simplicity, and emphatic brevity, so as to be accounted models of the kind." Mr. Pinkerton has subjoined several instances to this purpose. The compass of a coin is so small, that artists have always been obliged to use abbreviations in the legends and inscriptions. This circumstance occasions considerable difficulty in interpreting them. Mr. Pinkerton, in the appendix to his valuable work, has furnished an explanation of those that most commonly occur.

Dr. Coningham, in his Tract on Modern Medals, cited by Mr. Pinkerton, enumerates five kinds of improper legends on modern medals; viz. poetical, impious, jingling, intricate, and abusive. Of the first kind he instances a French medal, struck on occasion of some advantage over the English at sea, *MATURATE FUGAM*, which, he says, reminds us of Virgil and not of the action. Mr. Addison, in his third dialogue on medals, vindicates poetical legends. But Mr. Pinkerton

justly observes, that medals are certainly meant to be historical, and that poetry has in it something alien to history and destructive of its reality; and he adds, that the ancients do not afford a single example of a poetical legend on a medal. Of the jingling kind of legend is that of Francis Morozini, Jupiter with an urn, GAUDET FLUMINE NON FULMINE, and also that of Richard Cromwell, NON DEFICIENT OLIVÆ, confounding the olive-tree with Oliver Cromwell. To the intricate kind is referred the chronological coin of Gustavus Adolphus, king of Sweden, CHRISTVS DVX ERGO TRIVMPHVS, the numeral letters making the year 1632. Of the abusive kind is the Dutch medal on their stadtholder, QVANTVM MUTATUS AB ILLO, and Louis XIV., VIRO IMMORTALI CUM FISTULA IN ANO. To these long legends might be added. The ancient legends are remarkable for simple brevity and energy; and the best of the modern class are formed on their model.

For further particulars we refer to Mr. Pinkerton's "Essay on Medals," 1789, vol. i. § 12, vol. ii. § 18. See MEDALS.

LEGER, ANTHONY, in *Biography*, a learned Piedmontese, was born in the year 1594. After pursuing his studies at Geneva, he entered the work of the ministry, the duties of which he discharged many years with great punctuality. In 1628 he went to Constantinople, as chaplain to the ambassador of the States-general in the Ottoman Porte, and there became intimately connected with the celebrated Cyrillus. On his return to Piedmont in 1637, he was chosen pastor of the church of St. John, a situation which he retained six years; during which he displayed much talent and learning in the defence of the Protestant faith. In 1643, he was proscribed by the duke of Savoy, and was obliged to seek for safety in Geneva, where he not only exercised his profession, but was elected professor of the Oriental languages, and of divinity. He died in 1661, at the age of sixty-seven. He published at Geneva an edition of the New Testament in two vols. 4to. in the Greek and French languages. He left a son of the same name, celebrated as an eloquent preacher, who died in 1719, and after his death five volumes of his sermons were published. Moreri.

LEGER, JOHN, nephew of Anthony, was born in 1615, and educated for the profession of the ministry, was chosen to succeed his uncle when he was obliged to fly for his life to Geneva. In this church he continued his labours till the year 1655, when the persecution of the WALDENSES (which see) broke out with great rage. Leger made his escape to France, and from thence he transmitted an affecting account of the cruelties perpetrated on the Protestants to Oliver Cromwell, who sent an extraordinary ambassador to the duke of Savoy, to remonstrate with him on those proceedings. Leger likewise applied to the king of France, and to the Protestant states, soliciting their interference in behalf of his countrymen. A treaty, now agreed on, seemed to promise future security and toleration. Leger was at the signing of this treaty, which being very shortly broke, and new oppressions and persecutions fell loose on the inhabitants of the valleys, he was appointed deputy general to several Protestant powers to solicit again their mediation with the duke of Savoy. This gave such offence to the court of Turin, that Leger was proclaimed a traitor, and his house ordered to be razed to the ground. He now became pastor of the Walloon church at Leyden, and in 1664, he visited secretly the valleys, carrying with him considerable sums of money collected from the Protestants, for the relief of his persecuted countrymen. He was author of a valuable history of the Evangelical churches in the valleys of Piedmont. Moreri.

LEGÈREMENT, *Fr.* in *Music*, indicates a movement more lively than gay; it is the mean between gay and quick, answering nearly to *vivace* in Italian.

LEGER-LINE is used to signify a line added to the staff of five lines, when the ascending and descending notes run very high or very low. We often meet with several of these lines both above and below the staff.

LEGGÉ, GEORGE, in *Biography*, baron of Dartmouth, and an eminent naval commander, was born about the year 1647. The family derive their origin from Italy, but have for several centuries been resident in this country. Thomas Legge, from whom George descended, was lord mayor of London in the years 1346 and 1353. The subject of this article, being intended early for the sea-service, was brought up under admiral Spragge, and at the age of twenty obtained the command of a ship. In 1673 he was appointed governor of Portsmouth, master of the horse, and held an office under the duke of York. In 1682 he was raised to the peerage, and in the following year was sent to raze the fortifications of Tangiers. By James II. he was appointed master of the horse, general of the ordnance, and constable of the Tower. He had also the command of the fleet at the time of the prince of Orange's invasion, but was prevented from acting by contrary winds. At the revolution he was committed to the Tower, where he died in 1691, at the age of 44. English Peerage.

LEGGÉ, ELIZABETH, the eldest daughter of Edward Legge, esq. an ancestor of the preceding, and also of the present earl of Dartmouth, was born in 1580. She studied the ancient and several of the modern languages, and had a fine poetical genius, but became blind by much study. She lived chiefly in Ireland, and died unmarried at the age of 105. Her family were remarkable for longevity. One of her brothers lived to 109, one sister to be more than 100, and another died in her 120th year.

LEGGIADRO, LEGGIADRAMENTE, *Ital.* in *Music*, implies *gayly, lively, briskly*. See ALLEGRO.

LEGHĒA, in *Geography*, a town of Nubia; 16 miles W.N.W. of Dongola. N. lat. 20° 6'. E. long. 29° 30'.

LEGHENICH, or LECKENICH. See LECKNICH.

LEGHĪ, a town of Arabia, in the province of Yemen; 56 miles E.N.E. of Aden.

LEGHORN, or LIVORNO, a considerable, regular, well-built, fortified and flourishing city and sea-port of Etruria (formerly the grand duchy of Tuscany); and, on account of its canals, called the *New Venice*. It is a bishop's see, defended by a castle, two small forts, and a broad ditch, situated in a marshy and insalubrious territory on the sea-coast, opposite to Malora, a small island, and distant about 14 miles from Pisa. The canals that intersect its environs have rendered the marsh fit for culture, and in some degree contributed to its greater salubrity. Its streets are straight, uniform, and spacious; and many of the buildings are not inelegant. The town is of a square form, and 12,790 feet in circuit, and contains a ducal palace, many religious houses, and from 40,000 to 50,000 inhabitants, of whom 15,000 are Jews, who live in a particular part of the city, are allowed a handsome synagogue, and though subject to heavy imposts, are in a prosperous state, as the greatest part of the commerce of the city is conducted by them. The Greeks and Armenians have each their peculiar church, most of them acknowledging the pope's supremacy. The free Turks and Turkish slaves have a mosque; but the Protestants are not permitted the public exercise of their religion, the English excepted, who are allowed to have a chaplain, because of all foreign nations they are the best customers to Leghorn. Other Protestants make use of chaplains of ships. Prostitutes are

restricted to a particular quarter, consisting of several streets. The heavy taxes payable to the government, from various necessities brought into the town from the continent, together with monopolies of brandy, tobacco, and salt, render provisions and other commodities very dear. The inhabitants carry on an extensive trade, which is much promoted by the freedom of the port; every bale of goods, great or small, paying only two pialres or feudi. The harbour, which is secure, is divided into the outward and inward; the latter serving merely for four or five galleys, which are sometimes sent to sea against the corsairs, under the command of a knight of St. Stephen. In the open place before this harbour stands a marble statue of Ferdinand I., and at the angles of the pedestal are four brazen statues, of a gigantic size, representing four Turkish slaves in chains. The outward harbour is formed by a mole or dam, 600 common paces in length, well paved, with a partition in the middle, that serves to shelter the shipping from the wind on one side. The mole serves also for an occasional promenade. The harbour has not sufficient water for large ships, which therefore lie out of the mole, moored to pillars and large iron rings; and they are thus safer than if they were in the harbour. The road, for a mile or two, is good, but not secure against winds and corsairs. Without the harbour on a rock is a light-house, where 30 burning lamps are contained in one lantern, and on the shore, not far from it, is a lazaretto, where quarantine is performed by persons and goods, that come from suspected places. (See LAZARETTO.) The power of the inquisition at Leghorn extends only to Roman Catholics, and comprehends only cases of religion. In June 1766 the French took possession of this town, and destroyed the fortifications. N. lat. 43° 32'. E. long. 10° 16'.

The principal monies of account at Leghorn are the lira and pezza; the former being chiefly used in domestic trade, and the latter in foreign commerce and exchanges. Each of these is divided into 20 parts called soldi, and the soldo is subdivided into 12 parts called denari. The pezza of Leghorn was originally the Spanish peso, and hence it is called the pezza de otto reali by the Italians, the piastra by the French, and dollars by the English. This pezza, valued in silver, is worth 46½d. sterling, but valued in gold, it is worth 49d. sterling; which is the intrinsic par between London and Leghorn, as bills in the latter place are paid in gold. The lira is either the lira moneta lunga, or the lira moneta buona; the former being an imaginary money of account, and the latter the real money of all Tuscany. The lira is, as in Florence, according to the rate of coinage, worth about 8d.

Accounts on Leghorn are understood to be in moneta lunga; and 23 lira moneta buona are worth 24 lira moneta lunga. The lira has its subdivisions. The pezza is worth 5½ lira moneta buona, or six lira moneta lunga. Foreign bills in Leghorn, unless particularly excepted, must be paid in gold, that is, in Florence sequins or ruspioni, by weight. No days of grace are allowed; but bills are paid three times a week at the "Stanza," a place where merchants meet on Mondays, Wednesdays, and Fridays. In freighting ships at Leghorn, 20 cheils of fruit, 26 barrels of oil, 44 barrels of wine, 5600lb. of alum, are reckoned one last, or two tons.. See Kelly's Universal Cambist. vol. i.

LEGHNAU, a town of Prussia, in the province of Ermeland; 22 miles S.E. Heilsberg.

LEGION, a kind of regiment, or body of forces, of a number of which the Roman armies were chiefly composed.

The word comes from the Latin *legere*, to choose; because

when the legions were raised they made choice of such of their youths as were the most proper to bear arms.

The number of soldiers and officers of which the legion consisted, was different at different times; but it is impossible to determine the precise time and manner of their alteration. In the time of Romulus, the institutor of this corps, each legion contained three thousand foot, and three hundred equites, or horse: these were divided into three bodies, which make as many orders of battle; each body consisting of ten companies, or maniples, ranged at some distance from each other, though in the same front. Each body had two general officers to command it, called *tribunes*; and each manipule, two centurions.

Under the consuls, the legion consisted of four thousand, or four thousand two hundred foot soldiers, who made four bodies, commanded by a consul, or one of his lieutenants; and each legion had its share of cavalry, which was three hundred horse.

About the year of Rome 472, it was composed of five thousand foot; which was the number of a legion during Julius Cæsar's wars with the Gauls. Under Augustus, each legion consisted of six thousand one hundred foot, and seven hundred and twenty-six horse. After his death, they were reduced to five thousand foot and six hundred horse. Under Tiberius, the legion was raised again to six thousand foot and six hundred horse. In the time of Septimius Severus, the legion was composed of five thousand men: under the following emperors, it was the same as it had been under Augustus.

In the time of Marius, those four divisions of the legion which had taken place under the consuls, were united into one, and augmented; and cohorts were appointed from five to six hundred men, each under the command of a tribune. Each cohort consisted of three companies of maniples, each manipule of two centuries, and the legion was divided into ten cohorts, who made as many distinct battalions, disposed in three lines; so that the legion, then, consisted of six thousand men.

Isidore tells us, that the legion consisted of six thousand men, and was divided into sixty centuries, thirty manipules, twelve cohorts, and two hundred troops. According to the French academy, the legion consisted of six thousand foot, and seven hundred and twenty-five horse. The legion consisted of four sorts of soldiers, who differed in their age, arms, and names: they were called *Velites*, *Hoplites*, *Principes*, and *Triarii*. (See ARMS.) Till the destruction at Cartilage, these were citizens of Rome, but after the Social War, the freedom of the city was granted to other towns in Italy, and legionary troops were raised which were called Roman, because as they shared the privilege of Roman citizens, they were incorporated in the republic.

The legions were by far the most considerable part of the Roman army; their number, in the time of Augustus, was thirty-three; they were composed wholly of Roman citizens. The allies formed a body of auxiliary forces. See the sequel of this article.

The standard borne by the legions was various; at first, a wolf, in honour of that which suckled Romulus; afterwards an hog; by reason, says Festus, war is only undertaken with a view to peace, which was concluded by sacrificing a hog. Sometimes they bore the minotaur, to remind their generals, that their designs were to be kept secret, and inaccessible as the minotaur in the labyrinth. They also bore a horse, a boar, &c. Pliny tells us, that Marius was the first who changed all these standards into eagles. See EAGLE.

The different legions were distinguished, according to the order.

## LEGION.

order in which they were raised, into first, second, and third, &c. by the names of the emperors who formed them into legio Augusta, Claudia, Flavia, Trajana, &c. by the provinces where they had served, as legio Parthica, Mædonica, &c. and by some famous exploit or display of valour.

We shall here subjoin some further particulars relating to the constitution and military services of the imperial legion. It was composed of infantry and cavalry. The heavy-armed infantry, which composed its principal strength, was divided into ten cohorts (see COHORT), and fifty-five companies, under the orders of a correspondent number of tribunes and centurions. The first cohort, which always claimed the post of honour, and the custody of the eagle, was formed of 1105 soldiers, the most approved for valour and fidelity. The remaining nine cohorts consisted each of 555; and the whole body of legionary infantry amounted to 6109 men. Their arms were uniform, and admirably adapted to the service which they were required to perform; they consisted of an open helmet, with a lofty crest, a breast-plate, and coat of mail; greaves on their legs; and an ample buckler on their left arm. The buckler was of an oblong and concave figure, four feet in length, and two and a half in breadth, formed of a light wood, covered with a bull's hide, and strongly guarded with plates of brass. Besides a lighter spear, the legionary soldier grasped in his right hand the formidable *pilum* (which see); and as soon as he had darted this from his hand, he drew his sword, and rushed forward to close with the enemy. His sword was a short well-tempered Spanish blade, that carried a double edge, and was alike adapted to the purpose of pushing or striking; but the soldier was always instructed to prefer the former use of his weapon, as his own body remained less exposed, while he inflicted a more dangerous wound on his adversary. See Veget. de Re Mil. l. ii. c. 1. Lipsius de Militia Romana. l. iii. c. 2.—7.

The legion was usually drawn up eight deep; and the regular distance of three feet was left between the files as well as ranks.

The cavalry, which was necessary for perfecting the force of the legion, was divided into ten troops or squadrons: the first, as the companion of the first cohort, consisted of 132 men; whilst each of the other nine amounted only to 66. The entire establishment formed a regiment, according to the modern expression, of 726 horse, naturally connected with its respective legion, but occasionally separated to act in the line, and to compose a part of the wings of the army. The cavalry of the emperors was not composed, like that of the ancient republic, of the noblest youths of Rome and Italy, who, by performing their military service on horseback, prepared themselves for the offices of senator and consul; and solicited, by deeds of valour, the future suffrages of their countrymen. Since the alteration of manners and government, the most wealthy of the equestrian order were engaged in the administration of justice and of the revenue; and whenever they embraced the profession of arms, they were immediately intrusted with a troop of horse, or a cohort of foot. Trajan and Adrian formed their cavalry from the same provinces, and the same class of their subjects, which recruited the ranks of the legion. The horses were bred, for the most part, in Spain or Cappadocia. The arms of the Roman troopers consisted in a helmet, an oblong shield, light boots, and a coat of mail. A javelin, and a long broadsword, were their principal weapons of offence. The use of lances and of iron maces they seem to have borrowed from the barbarians. Considerable levies were regularly made by the Romans among the provincials: and many dependent princes and communities, dispersed

round the frontiers, were permitted, for a while, to hold their freedom and security by the tenure of military service. Even select troops of hostile barbarians were compelled or persuaded to consume their valour in remote climates, and for the benefit of the state. All these were included under the general name of *auxiliaries*; and their number was seldom inferior to that of the legions themselves. By this institution each legion, to which a certain proportion of auxiliaries was allotted, contained within itself every species of lighter troops, and of missile weapons; and was capable of encountering every nation, with the advantages of its respective arms and discipline. Nor was the legion destitute of what, in modern language, would be styled a train of artillery. It consisted in ten military engines of the largest, and 55 of a smaller size; but all of which, either in an oblique or horizontal manner, discharged stones and darts with irresistible violence.

The camp of a Roman legion presented the appearance of a fortified city. See the description of it under CAMP. In their march, the legionaries carried their arms, and also kitchen furniture, instruments of fortification, and provision for many days. Thus laden, they advanced by a regular step, to which they were trained, near twenty miles in about six hours. On the appearance of an enemy, they threw aside their baggage; and by easy and rapid evolutions converted the column of march into an order of battle. The slingers and archers skirmished in the front; the auxiliaries formed the first line, and were seconded or sustained by the strength of the legions: the cavalry covered the flanks, and the military engines were placed in the rear.

As to the number of the legions, we may compute, that the legion, which was itself a body of 6831 Romans, might, with its attendant auxiliaries, amount to about 12,500 men. The peace establishment of Adrian and his successors was composed of no less than 30 of these formidable brigades; and most probably formed a standing force of 375,000 men. As to the position of the legions, they were encamped on the banks of the great rivers, and along the frontiers of the barbarians. As their stations were, for the most part, fixed and permanent, the troops may be considered as distributed in the following manner. Three legions were sufficient for Britain. The principal strength lay upon the Rhine and Danube, and consisted of sixteen legions, in the following proportions: two in the Lower and three in the Upper Germany; one in Rætia, one in Noricum, four in Pannonia, three in Mœsia, and two in Dacia. The defence of the Euphrates was entrusted to eight legions, six of which were planted in Syria, and the other two in Cappadocia. A single legion maintained the domestic tranquillity of each of the large provinces of Egypt, Africa, and Spain. Italy was not left destitute of a military force. About 20,000 chosen soldiers, distinguished by the titles of "City Cohorts" and "Prætorian Guards," watched over the safety of the monarch and the capital.

Under Constantine and his successors, the legions were very considerably reduced. When seven legions, with some auxiliaries, defended the city of Amida against the Persians, the total garrison, with the inhabitants of both sexes and the peasants of the deserted country, did not exceed the number of 20,000 persons. Hence we may infer, that the constitution of the legionary troops, to which they partly owed their valour and discipline, was dissolved by Constantine; and that the bands of Roman infantry, which still assumed the same names and the same honours, consisted only of 1000 or 1500 men. Nevertheless, the successors of Constantine indulged their love of ostentation, by issuing their orders to 132 legions, inscribed on the muster-roll of their

numeros

numerous armies. Under them the complete force of the military establishment was computed at 645,000 soldiers. Gibbon's Decl. &c. Rom. Emp. vol. i. and iii.

LEGION, *Square, legio quadrata*, was a legion consisting of four thousand men.

LEGIONUM, *Domestici*. See DOMESTICUS.

LEGION, *Thundering*. See THUNDERING.

LEGION, *Theban*, is a name given by some authors to a legion of Roman soldiers, who refusing not to sacrifice to idols, suffered martyrdom under the emperors Dioclesian and Maximilian, about the year of Christ 297. But the whole account of them seems to be fabulous.

LEGISLATOR, *LAWGIVER*, a person who frames the laws of a kingdom or state founded by him.

The principal ancient legislators are—Moses, legislator of the Hebrews; Mercurius Trimegistus, and Bocchyrus, of the Egyptians; Italus, of the Ænотrians; Theseus, Draco, and Solon, of the Athenians; Zoroaster, of the Bactrians; Charondas, of the Cappadocians; and Charondas, or Phaleas, of the Carthaginians; Andromadas, of the Chalcidians; Eudoxus, of the Cnidians; Phido, of the Corinthians; Mimos, of the Cretans; Pythagoras, of the Crotoniates, and most of the cities of the Græcia Major; Parmenides and Zeno, of Elea, in Lucania; Xamolxis, of the Getæ; Phoroneus, of the Greeks; Bacchus, of the Indians; Saturn, of Italy; Macarius, of the isle of Lesbos; Zaleucus, of the Locerians; Nicodorus Athleta, of the city of Mutina; Hippodamia, of Miletus; Charondas, of Rheggio; Lycurgus, of the Lacedæmonians; Archytas, of Tarentum; Philolaus, of the Thebans.

At Rome the people were in a great measure their own legislators; though Solon may be said, in some sense, to have been their legislator, as the decemviri, who were created for the making of laws, borrowed a great number from those of Solon.

With us the legislative power is lodged in the king, lords, and commons assembled in *parliament*; which see.

LEGITIMATE CHILD, a child born in lawful wedlock, or within a competent time afterwards. "Pater est quem nuptiæ demonstrat" is the rule of the civil law; and this holds with the civilians, whether the nuptials happen before, or after, the birth of the child. With us in England the rule is approved; for the nuptials must be precedent to the birth. See BASTARD.

LEGITIMATE *Delivery*. See DELIVERY and LABOUR.

LEGITIMATE *Tertian*. See FEVER.

LEGITIMATION, an act by which natural or illegitimate children are rendered legitimate. See BASTARD, &c.

By the French law, the father and mother, by marrying, render their children, begotten before marriage, legitimate; and this is called *legitimatio per subsequens matrimonium*.

The right of legitimation was a thing unknown to princes till the time of Constantine; but, since his time, has been exercised by most of them. The Greek emperors invented several kinds of legitimation.

Anastasis put it in the power of the father to legitimate his natural children by a bare adoption, provided he had no legitimate children. But Justin, by his constitution, and Justinian, by his Novel 74, abolished this legitimation, as fearing the too easy access to legitimation should encourage concubinage.

In lieu of this, he established a way of legitimation by the emperor's letters. This rendered bailards capable of attaining to honours, and even of succeeding to inheritances, provided the persons were legitimated with the consent of their father and mother; which is agreeable to the canon law.

LEGIUNCARA, in *Geography*, is a town of Naples, in the province of Bari; 21 miles N.W. of Matera.

LEGNA, *Λεγνα*, among the *Ancients*, a name given to the borders of the *toga* and *pallium*, that were on each hand; the extremities above and below being called *ora*.

LEGNANO, in *Geography*, a town of Italy, in the Veronese, on the Adige. The two divisions of this place are connected by a drawbridge; the eastern part is called Porto, and the western Legnano. It has several monasteries, and a playhouse. It is a populous town, and carries on a considerable trade by means of a corn-market held every Saturday, and a canal, running from Legnano to Obbligia, in the territory of Mantua. This was formed in 1762, between the Adige and the Po; and for the better security of its navigation, sluices have been constructed at both its ends. The French took possession of it in 1799; 22 miles E.S.E. of Verona. N. lat. 44° 50'. E. long. 11° 18'.

LEGNOTIS, in *Botany*, so named by professor Swartz, from *λεγνός*, fringed, because its petals are curiously lacinated and fringed. Schreb. 357. Swartz. Prod. 84. Ind. Occ. v. 2. 960. Willd. Sp. Pl. v. 2. 1171. Mart. Mill. Dict. v. 3. (Cassipourea; Aubl. Guian. v. 1. 528. t. 211. Juss. 432. Lamarck. Illustr. t. 406.)—Class and order, *Polyandria Monogynia*. Nat. Ord. uncertain.

Gen. Ch. Cal. Perianth inferior, of one leaf, bell-shaped, four or five-cleft half way down, permanent; segments ovate, acute, erect. *Cor.* Petals four or five, longer than the calyx; claws slender, almost as long as the calyx, inserted into the receptacle; borders ovate, very much fringed, villose. *Stam.* Filaments sixteen or twenty, thread-shaped, equal, the length of the calyx, inserted into the receptacle; anthers oblong, erect. *Pist.* Germen superior, roundish; style cylindrical, as long as the stamens; stigma capitate. *Peric.* Capsule large, elastic, triangular, with three cells and three valves. *Seeds* solitary, convex on one side, angled on the other.

Obs. Sometimes the number of cells and valves in the fruit is liable to variation.

Eff. Ch. Capsule superior, of three cells. Petals inserted into the receptacle, very much fringed or torn.

1. *L. elliptica*. Swartz. Prod. 84. Willd. n. 1.—Leaves elliptical. Flowers on footstalks.—A native of lofty mountains in Jamaica, flowering in May and June.—This is a tree from ten to thirty feet in height, having a smooth, brown bark. Branches determinately subdivided, erect, smooth; the smaller ones slightly compressed. *Leaves* on footstalks, opposite, ovate-acuminate, or oblong-lanceolate, entire, scarcely nerve, smooth on both sides, somewhat rigid; footstalks short, flat above, roundish underneath. *Stipulas* small, ovate, membranaceous, downy, deciduous, between the footstalks. *Flower-stalks* axillary, from three to five, simple; scarcely so long as the leaf-stalks, with a few minute scales at their base. *Capsule* smooth, white and downy within. *Flowers* flesh-coloured, villose with white hairs.

Obs. The downy style becomes elongated to twice the length of the calyx, after flowering.

2. *L. Cassipourea*. Swartz. Prod. 84. Willd. n. 2. (Cassipourea guianensis; Aubl. Guian. t. 211.)—Leaves ovate. Flowers sessile.—A native of moist places in Cayenne, flowering in January.

A middling-sized tree, with a grey bark, about five feet in height, branched at the summit; smaller branches opposite, knotty. Its wood is white. *Leaves* issuing from the knobs, ovate, acute, smooth, entire, nearly sessile, accompanied at their base by two very minute stipulas. *Flowers* axillary, in tufts, white, sessile, situated between two opposite bractæas.

LEGOUZIA, Juss. 450, a name destined by M. Durand,

rande, for those *Campanule* which have a nearly flat, or wheel-shaped corolla, and an oblong prismatic capsule, which L'Heritier has likewise separated from *Campanula*, under the appellation of *Prismatocarpus*. See *CAMPANULA*, section \*.

**LEGRAD**, in *Geography*, a town of Croatia, at the union of the Muncer and Drave; 15 miles E. of Varadlin. N. lat. 46° 30'. E. long. 16° 54'.

**LE GRAND**, a considerable river of America, in the state of Ohio, which rises within a few miles of the W. extremity of lake Erie, and pursuing a N.N.W. course for nearly 100 miles, and then turning to the W., discharges itself into lake Michigan. At its confluence with the lake it is about 250 yards wide.

**LEGRENZI**, DON GIOVANNI, in *Biography*, an able master and fertile Italian composer of the seventeenth century. He was a native of Bergamo, and produced for the different theatres of Venice fifteen operas between the years 1664 and 1684. He was likewise a favourite composer of cantatas, of which he published at Venice two books: one of ten, in 1674; and a second book containing fourteen, in 1679. During his youth he was some time organist of Santa Maria Maggiore, in his native city of Bergamo; then maestro di cappella of the church Dello Spirito Santo, in Ferrara; and lastly of St. Mark's at Venice, and master of the Conservatorio de Mendicanti. He was the master likewise of the two great musicians, Lotti and Francesco Gasparini, both of whom are said to have resided in his house at Venice in the year 1684, in order to receive his instructions. He was also an instrumental composer, and among the most early trios for two violins and a bafe, may be numbered, "Suonate per Chiesa," by Legrenzi, published at Venice, 1655; "Suonate da Chiesa e Camna," 1656; "Una muta di Suonate," 1664; and "Suonate a due Violini e Violone," 1677. Of this last work we are in possession, and upon viewing it, find, that though Legrenzi has introduced into these pieces some of the best melody of the times, and there is considerable merit in the texture and contrivance of the parts, yet, for want of the knowledge of the bow, and the particular energies and expressions of the violin, these compositions have been long since justly superseded and effaced by superior productions of the same kind.

**LEGS**, the lower extremities of the bodies of most animals, serving them for support and motion. See *EXTREMITIES*. See also references under *LEG*.

**LEGS**, in the *Manege*, the members that support a horse's body, and perform the motion when he goes. Of the four legs, the two before have several parts, each of which has a peculiar name: so that by the name of fore-legs, we commonly understand that part of the fore-quarters that extends from the hough to the pattern-joint, and call it the *shank*; the part that corresponds to this in the hind-quarters is called the *instep*. But in common discourse we confound the fore and the hind-quarters; and without any distinction say the *four legs* of a horse. The French call a horse *droit sur les jambes*, i. e. straight-membered, or straight upon his legs, when the fore-part of the pattern falls perpendicularly upon the coronet, and the shank and the pattern are in a straight line. See *STRAIGHT* and *LONG-JOINTED*. See also *HORSE*.

The horseman's legs are likewise of singular concern in the manege, for the action of these given seasonably, and with a little judgment, constitutes one of the principal aids, which consists in approaching more or less with the calf of the leg to the horse's flank, and in bearing it more or less off as there is occasion. This aid a horseman ought to give very nicely, in order to animate a horse: and it is so much

the finer, that it is hidden and private: for in stretching the ham he makes the horse dread the spur, and this aid has as much effect as the spur itself. See *AIM*.

**LEGS**, in *Rural Economy*, are the extremities that form the support of animals. In horses they should have a due proportion to that of the body. The fore-legs are subject to many infirmities, as being the parts that suffer most, and are commonly the weakest. It is a mark of bad legs when they appear altogether straight, or, as if they were of one piece. A horse is said to be straight upon his legs, when from the knee to the fore-part of the coronet, the knees, shank, and coronet descend in a straight or plumb-line, and the pattern joint appears more, or at least as much advanced as the rest of the leg; such legs are like those of a goat, making a horse apt to trip and fall; so that in time the pattern is thrust quite forward out of its place, and the horse becomes lame and liable to stumble.

Horses which are straight upon their legs are quite contrary to those that are long-jointed, that is, whose patterns are so long and flexible, that in walking, they almost touch the ground with them. And it is a greater imperfection than the former, because some remedy may be applied to them; but there can be none for these: besides it is a sign of little or no strength, such horses not being fit for much fatigue. Some horses, though they be long-jointed, do not bend their patterns in walking; such horses gallop and run with greater ease to their riders than such as are short jointed.

In the language of the stable a horse is said to want the fifth leg when he is tired, and, bearing upon the bridle, lies heavy upon the rider's hand, so as to produce much fatigue.

**LEGS**, *Arched*. See *ARCIED*.

**LEGS**, *Compassee* of three. See *COMPASSES*.

**LEGS**, *Hyperbolic*. See *HYPERBOLIC*.

**LEGS**, *Long*, in *Natural History*. See *TYPULA*.

**LEGS** of the *Martinet*, in a *Ship*, are used for those small ropes which are put through the bolt-ropes of the main and fore-sail, in the leech of each. They are above a foot in length, and at either end are spliced into themselves; they have also a small eye, into which the martinet are fastened by two nitches, and the end is seized into the standing part of the martinet.

**LEGS** of a *Triangle*.—When one side of a triangle is taken as a base, the other two are called legs. See *TRIANGLE*.

**LEGUEVIN**, in *Geography*, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the district of Toulouse; nine miles W. of it. The place contains 6689 and the canton 9549 inhabitants, on a territory of 117½ kilometres, in 10 communes.

**LEGUIGNO**, a town of the duchy of Parma; 18 miles S.S.E. of Parma.

**LEGUME**, in *Botany*, *legumen*, the pod proper to the pea or papilionaceous tribe of plants, thence termed, by some writers, *leguminosæ*. (See *LEGUMINOSÆ*.) The Latin word *legumen* is laid by the ancients themselves to be derived from *lego*, to gather; because such fruits are gathered or plucked from their stalks, not reaped nor mown. They are termed in English *pulse*.

This sort of seed-vessel is always solitary and simple, formed of two mostly oblong, equal, more or less coriaceous, parallel valves, without any distinct longitudinal partition, and bearing the seeds along one of its margins only. The top is terminated by the remains of the style, which is short, and placed obliquely, or out of the axis; the base is somewhat contracted towards the stalk. One of the margins, where the seeds are inserted, is generally rather shorter than the other, and externally more furrowed, the other being often rounded

rounded or wavy, and more compressed. There are, however, various shapes of legumes, some of which are peculiar to certain genera, as the spiral ones of different species of *Medicago* and *Scorpiurus*; the cylindrical, prismatic, or rhomboid ones of other genera. Such differ essentially from that kind of seed-vessel termed a *siliqua*, or pod properly so called, in having the seeds at one margin only, whereas the *siliqua* has them arranged along both. The furrowed edge of the legume, which bears the seeds, is called the future.

The capsules of *Helleborus*, and some other plants allied thereto, termed by Linnaeus rather incorrectly *multisiliquae*, are jully indicated by Gærtner as approaching to the definition of legumes. They differ, however, in consisting each but of one valve, and in not being solitary or single in each flower, except the instance of a few species of Larkspur, *Delphinium*, which differ from the natural character of their genus, in having one instead of three germens and seed-vessels; but analogy here teaches the true nature of the part in question. We are, indeed, obliged to have recourse to the same guide in a few papilionaceous genera, whose seed-vessel, otherwise a true legume, contains but one seed, as in most species of *Trifolium*, or whose valves do not separate, but become thickened and hard, as in *Pterocarpus*, or leathery, as in *Viminaria*.

When a legume is divided into several cells, it is either by an inflexion of its valves, as in *Astragalus* and *Mirbelia*, or by transverse constrictions, as in *Vicia* and *Genista*, or even membranous transverse partitions, as in *Securidaca* and *Cassia*. Some, however, are still more distinctly divided, separating as they ripen into distinct joints, each of which contains a single seed, and does not in general burst till that seed forces its way by vegetating, as in *Hedysarum*, *Scorpiurus*, and *Hippocrepis*. This latter kind of legume has lately been considered as a peculiar sort of pericarp, and called *lomentum*; but the gradations leading to it are so imperceptible, that unless a multitude of other distinctions were made, we do not see the eligibility of this.

Several legumes are internally spongy, fleshy, or pulpy, in which respects they vary greatly in the progress of their growth, as the bean (*Vicia Faba*), the Tamarind, the *Ceratonia*, the *Hymenaea*, &c.

Amid all the diversities of structure in this kind of pericarp, it is most difficult to admit as a legume the three-valved seed-vessel of Gærtner's *Moringa*; our HYPERANTHERA.

LEGUMINOSÆ, a natural order of plants, so called from the nature of their fruit. (See LEGUME.) It is the 93d order of Jussieu's system, the 11th of his 14th class, and embraces the Linnaean *Papilionacea* and *Lomentacea*.

For the detailed character of Jussieu's 14th class, see FICOIDEÆ. It has two cotyledons, many petals, and stamens inserted into some part of the calyx.

The *Leguminosæ* are thus defined.

Calyx of one leaf, variously divided. Corolla of many petals, rarely either wanting or monopetalous, inserted into the upper part of the calyx, below its divisions. Petals sometimes five, rarely fewer, regular and nearly equal; but more frequently four, and irregular, all together imitating the shape of a butterfly, whence the term papilionaceous flower; of these the upper and outer one is the standard, *ve.illum*, half embracing the rest, and mostly exceeding them in dimensions; the next two are the wings, *ala*, which are lateral; the lower and innermost is the keel, *carina*, which is either simple or divided. Stamens ten, rarely more or fewer, inserted into the calyx under the petals, their filaments sometimes distinct, or slightly united at their base, or more frequently diadelphous, (see DIADELPHIA,) that is,

consisting of nine united into a tube, which is slit lengthwise under the standard, with a tenth applied close to that fissure, or the whole are really monadelphous, the tube being undivided and decandrous; the anthers are distinct, often roundish and small, sometimes oblong and incumbent. Germen simple, superior; style one; stigma undivided. Fruit in a few instances capsular, of one cell, with scarcely more than one seed, either of two valves, or not bursting at all; in most it is leguminous, as the name of the order implies, longish, of two valves, (of three in *Moringa*, or *Hyperanthera*, of four in one species of *Mimosa*), the seeds affixed to one of the lateral futures; sometimes it is of a single cell, with one seed or several, sometimes of many cells separated by transverse partitions, each cell containing one seed, and all being occasionally pulpy. In the polypetalous irregular genera the radicle of the *corculum* or embryo inclines towards the lobes, and there is no perisperm or *albumen*; in those with more regular flowers the radicle is straight, and there is a perisperm, or thickish membrane, unfolding the embryo; the lobes of the seed are mostly changed into seminal leaves, according to the usual mode of dicotyledonous vegetables, but sometimes they remain distinct below the first leaves. The stem is either herbaceous, shrubby or arborescent, branched for the most part in an alternate manner. Leaves furnished with stipulas, alternate, in a very few instances imperfectly opposite, sometimes simple, but oftener ternate, or fingered, or once or more pinnate. The flowers are variously disposed.

The sections are eleven.

1. Corolla regular. Legume of many cells, mostly of two valves, with transverse partitions, the seeds solitary in each cell. Stamens separate. These are trees or shrubs, with abruptly pinnate leaves. The section contains *Mimosa*, *Gleditsia*, *Gynnocladus*, *Macrolobium* of Schreber, *Ceratonia*, *Tamarindus*, *Parkinsonia*, *Schotia* of Jacquin, and *Cassia*.—To these may be added *Azalia*, Smith Transf. of Linn. Soc. v. 4. 221.

2. Corolla regular. Legume of one cell, and two valves. Stamens ten, separate.—Trees or shrubs, with abruptly pinnate leaves. (In *Hyperanthera* they have terminal leaflets, and the legumæ has three valves.)

This comprehends *Hyperanthera*, (*Moringa* of Jussieu,) *Prosopis*, *Hematoxylum*, *Dimorpha*, of Schreber, *Cubæa* of the same, *Adenanthera*, *Poinciana*, *Casalpinia* (the two last being really one genus) and *Gulandina*.

3. Corolla somewhat irregular. Stamens distinct, or only connected at their base. Legume of one cell and two valves.—Trees or shrubs, with leaves either abruptly pinnate, or merely conjugate, or quite simple.

Here are *Dipteryx* and *Dimorpha* of Schreber, with *Cynometra*, *Hymenaea* and *Bauhinia* of Linnæus, and *GINANNIA* of the former. Jussieu admits *Vouapa* of Aublet, which Schreber unites to *Outea* of the same author, his own *Macrolobium*; see sect. 1.

4. Corolla irregular, papilionaceous. Stamens distinct, or rarely connected at their base. Legume mostly of one cell, and two valves.—Trees or shrubs; their leaves either simple, or ternate, or pinnate, with an odd leaflet.

Jussieu here enumerates only *Cercis*, *Rittrra* of Schreber, *Anagyris*, *Sophora*, *Mullera*, and *Coublandia* of Aublet, the character of which last is very puzzling. But to this section belongs a numerous tribe of New Holland genera, established by Dr. Smith, in the Annals of Botany, and in Tr. of Linn. Soc. v. 9. 245. These are *Putanea*, *Aotus*, *Gompholobium*, *Chorozema*, *Daviesia*, *Viminaria* (though the legume of this last does not burst), *Sphaerolobium*, *Dillwynia*, *Mirbelia* (though the legume has two cells), and *Calif-tachya*.

*tachya*. To these, moreover, are to be added several genera from the new edition of Hort. Kew. v. 3; *Edwardsia*, *Ormosia*, *Thermopsis*, *Virgilia* of Lamarck, *Cyclopia*, *Baptisia*, *Podalyria*, *Fodolobium*, *Oxylobium*, *Brachycyfa*, *Burtonia*, *Jackfonia* (see the latter in its place), *Eutaxia*, *Sclerobanauus*, *Glyrolobium* and *Euchus*.

5. Corolla irregular, papilionaceous. Stamens ten, diadelphous. Legume of one cell and two valves.—Shrubs or herbs; their leaves simple or ternate, or rarely fingered; the stipulas sometimes scarcely discernible, sometimes conspicuous, either attached to the bottom of the footstalk, or distinct from it.

This angle section contains *Ulex*, *Aspalathus*, *Borbonia*, *Liparia*, *Genista* (the latter including *Spartium* of Linnæus), *Cytisus*, *Crotalaria*, *Lupinus*, *Ononis*, *Acrachis*, *Anthyllis*, *Dalea*, *Pterocala*, *Trifolium*, *Melilotus*, *Medicago*, *Trigonella*, *Lotus*, *Dorobus*, *Platycolus*, *Erythrina*, *Urtica*, and *Glycine*.—Here are to be added *Platylobium*, *Boschia* and *Poirertia* of Smith in Tr. of Linn. Soc. v. 9. 301, also *Buta* of Kœnig and Roxburg, and *Haltia* of Thunberg, with doubtless many more.

6. Corolla, Stamens, and Legume as in the last. Herbs or shrubs, or small trees, whose leaves are pinnate with an odd leaflet. In a few the legume has two cells.

*Abrus*, *Amorpha* (remarkable for wanting both wings and keel), *Pisicida*, *Robinia*, *Caragana*, *Astragalus*, *Phaca*, *Biserrula*, *Colutea*, *Glycerhiza*, *Galgua*, and *Indigofera*.

7. Cor. Stam. and Legume as in the two last.—Herbs, with pinnate, or conjugate, or sometimes scarcely any, leaves, the common footstalk ending in a tendril; stipulas distinct from the footstalk.

*Lathyrus*, *Pisum*, *Orobus*, *Vicia*, *Faba*, *Ervum*, and *Cicer*.

8. Cor. and Stam. as in the three last. Legume composed of single-seeded joints.—Herbs or shrubs, rarely trees; leaves simple or ternate, or more frequently pinnate with an odd one; stipulas distinct from the leaf-stalk.

*Scorpiurus*, *Ornithopus*, *Hippocrepis*, *Coronilla*, *Hedysarum*, *Achyrocneme*, and *Diphysa*. Here belongs *Suañbia* of Ait. Hort. Kew. ed. 1.

9. Corolla as before. Stamens mostly ten, diadelphous. Legume capsular, of one cell, often not bursting, with scarcely more than one seed.—Trees or shrubs; leaves generally pinnate with an odd one; stipulas distinct from the footstalk, soon falling.

*Dalbergia*, *Amerimnon* of Browne's Jamaica, *Galegupa* of Lamarck, *Andira* of the same, *Geoffrea*, *Degubia* of Lamarck, *Nifolia*, *Dipteryx* of Schreber, *Acourea* of Aublet, and *Pterocarpus*, are the genera clasped here by Jussieu, which have all a general affinity to each other.

10. Corolla irregular (sometimes wanting). Stamens ten, distinct. Legume capsular, of one cell, generally not bursting, containing a single seed.—Trees or shrubs; leaves either pinnate with an odd one, or simple; stipulas distinct from the footstalk, soon falling.

*Crada* of Schreber, *Detarium* of Jussieu, *Copaifera*, and *Myrosylon*.—According to the definition of this section, *Fimbrinaria* belongs to it; but is too unlike the rest, and too closely allied in habit and character to the plants with which we have placed it in sect. 4, to be separated from them.

11. Jussieu concludes here with four genera, termed by him "akin to the leguminosa." These are *Securidaca*, which seems to belong properly to sect. 9, *Brownnea*, *Zygia* of Browne's Jamaica, and *Aruna* of Schreber.

It will easily be perceived that this arrangement requires much correction and reformation, in consequence of discoveries subsequent to its publication. The whole order is

so natural, that its subdivisions are proportionably difficult to be devised, and the same may be said of its generic distinctions. If Linnæus was obliged, by the laws of his artificial system, to offer great violence to this order, as Jussieu and others have not failed to observe, his class *Diadelphia* does honour to his penetration, and to the comprehensive systematic powers of his mind.

LEGUMINOUS FLOWERS. See FLOWER.

LEGUMINOUS Plants, in Gardening, a term applied to all such as are of the pulic kind, as those of the pea, bean, and other similar descriptions.

LEHE, in Geography, a town of the duchy of Bremen; 32 miles N. of Bremen.

LEHEIM, a town of Hesse-Darmstadt; 8 miles W. of Darmstadt.

LEHI, in Scripture Geography, a city of Palestine, in the tribe of Dan, near Eltak or Eltaka. This was a sacerdotal city, given to the sons of Cohath. Here Samson slew a thousand Philistines with the jaw-bone of an ass.

LEHI, *Lehigh*, or *Leche*, in Geography, a river of America, which rises in Northampton county, Pennsylvania, about 21 miles E. of Wyoming Falls, in Susquehanna river, and passing, by a circular course, through the Blue mountains, discharges itself into De'aware river, on the S. side of Eulton, 11 miles N.E. of Bethlehem. Its course is about 75 miles, and it is navigable 30 miles.

LEHMKUHLN, a town of Holstein; 8 miles S.W. of Lutzenberg.

LEHRBERG, a town of Germany, in the margravate of Anspach, on the Unter Retzat; 5 miles N.W. of Anspach.

LEHSO, a town of Arabia Deserta; 140 miles S. of Cathem.

LEHSTEN, or LEHESTEN, a town of Saxony, in the principality of Altenburg, celebrated for its quarries of slate; 45 miles S.S.W. of Altenburg. N. lat. 50° 25'. E. long. 11 35'.

LEHTIMAKI, a town of Sweden, in the government of Wafa; 65 miles E.S.E. of Wafa.

LEIBEN, a town of Austria; 10 miles W.N.W. of Crems.—Also, a town of Austria; 14 miles S.W. of Crems.

LEIBLINGEN, or LYPTINGEN, a town of Germany, in the lordship of Natenberg; 6 miles E. of Tuttingen.

LEIBNITZ, GODFREY WILLIAM DE, in Biography, an eminent German philosopher and mathematician, was born at Leipsic in the year 1646. He lost his father when he was very young, and of course the care of his education devolved on his mother. She placed him under able masters, who had been colleagues of his father in the university, of which he had been professor of moral philosophy, and secretary. The son made a very rapid progress in the different branches of science and learning. He not only became a deep classie, but availed himself of the advantages of a large and well chosen library, which his father had left him, and read all the books which it contained in regular order, as the poets, orators, historians, civilians, philosophers, mathematicians, and divines. Such was his application, that he could repeat the works of the principal poets, and so tenacious was his memory, that even in old age he could, without hesitation, run through the whole of the *Æneid*, without missing a line or a word. He had a talent for making verses, and is said to have composed three hundred in one day. When he was fifteen years of age he became a student in the university of Leipsic, where he profecuted, with great success, the various studies of the law, medicine, philosophy, and theology. Having finished his studies at Jena, the principal

cipal objects of his attention were history, law, and the mathematics. He was particularly attached to the writings of Plato and Aristotle, and is said to have spent whole days in meditation, in a forest near Leipzig. He principally devoted himself to the study of the law, and took his degree of bachelor in 1665, and in the following year he supplicated for his degree of doctor, which was refused, under the pretence that he was too young, being then only in his twentieth year, but it was imagined that the real cause was his having abandoned the tenets of Aristotle and the schoolmen. Offended at this treatment, he went to Altdorf, where he maintained a thesis, "De calibus perlexis," and in the disputations on this occasion, he displayed such uncommon abilities, that he had the degree of doctor instantly conferred upon him, and was even offered a professorship extraordinary in law, which he declined. He about this period published a work, entitled "Ars Combinatoria," intended to shew in what manner universal arithmetic may be applied to other sciences. This was accompanied with "A mathematical Demonstration of the Existence of God." From Altdorf Leibnitz went to Nuremberg, to visit the learned men in that university. He was at this place initiated in the mysteries of Alchemy. From Nuremberg he went to Mentz, and published, in 1668, "Nova Methodus Docendæ Discendæque Jurisprudentiæ," which gained him great applause. He next shewed himself as a politician, and wrote a treatise to induce the Poles to choose the elector-palatine their king, which so pleased the elector, that he invited the author to reside at his court, which invitation he would have accepted, had he not at the same time obtained the office of counsellor of the chamber of review in the chancery of Mentz. In 1670 he reprinted, with a preface and notes, the treatise of Marius Nizolius de Bersello, "De veris Principiis, et vera ratione Philosophandi contra Pseudophilosophos," to which he subjoined a letter, "De Aristotelæ recentioribus reconciliabili." In the year 1672, Leibnitz went to Paris, to manage some affairs at the French court: here he became acquainted with the greatest mathematicians in that metropolis, and made further and considerable progress in the study of mathematics and philosophy. Here also he met with Pascal's arithmetical machine, the defects of which he soon discovered, and to obviate these he invented a new one, which was highly approved by the minister Colbert, and the Academy of sciences. He was offered a seat in this body with a pension, and had the prospect of many other advantages if he would settle at Paris, but to attain this eminence he must embrace, or be supposed to embrace, the Catholic religion, which neither honours nor emoluments could induce him to do. In 1673 he came to England, and became acquainted with Mr. Oldenburg, the secretary, and Mr. Collins, a distinguished member of the Royal Society; from whom it was said he received some hints of the method of fluxions, which had been invented in 1664, or 1665, by Mr. Isaac Newton. Leibnitz improved these hints, and under the name of "calculus differentialis" he gave the same method of analysis with fluxions. (See KEIL and NEWTON.) While Mr. Leibnitz was in England he lost his patron, the elector of Mentz, and with him a pension which that prince had allowed him. He returned to France, whence he wrote to Frederic duke of Brunswic Lunenburg, informing him of his circumstances. This prince immediately appointed him a member of the Aulic council, with a regular salary, but he permitted him to remain at Paris, till his arithmetical machine should be perfected. When he entered upon his office at Hanover, one of his earliest cares was to furnish the prince's library with the best books in the various branches of science and literature. In 1677 he first mentioned his mathematical invention of diffe-

reentials to Newton, who had previously to this written to Leibnitz an account of his invention of fluxions; about the same period, he gave an account of some discoveries in optics and mechanics, describing a new method of polishing glasses. He became a constant contributor to the "Acta Eruditorum" of Leipzig, and among other pieces he published in this work "Thoughts on Knowledge, Truth, and Ideas." He next undertook a history of the house of Brunswic, and to render himself more competent to the task, he travelled over Germany and Italy, collecting materials. In passing from Venice to Mesola, a terrible storm arose, during which the pilot, imagining that he could not be understood by a German, whom, as a heretic, he regarded as the cause of the tempest, proposed to strip him of his clothes and money, and throw him overboard. Leibnitz, hearing the conversation, without the least emotion, drew a set of beads from his pocket, and began turning them over with great seeming devotion. The artifice succeeded; one of the sailors observing to the pilot, that since the man was not an heretic, he ought not to be drowned. Leibnitz returned to Hanover in 1690, where he pursued with great industry several objects of very different kinds. In a theological dispute he appeared the friend of toleration, and in 1693 he published a work on the law of nations, entitled "Codex Juris Gentium Diplomaticus." He next wrote his treatise "De ipsa natura, five Vi inîta," which was intended to improve and correct the philosophical notion of substance; and he likewise conceived the idea of a new science of forces, in which the laws of mechanics, and the measure of living forces might be clearly defined. This science he denominated *Dynamics* (which see), and insered a specimen of it in the "Acta Eruditorum." He published "Thoughts on Locke's Essay on the Human Understanding," in which he controverted that philosopher's opinions on innate ideas, substance, a vacuum, and other subjects; communicated to the world his ingenious invention of binary arithmetic; and wrote a reply to Dayle in defence of his doctrine of pre-established harmony. Without attempting to follow our author in all his publications, which were very numerous and important, we may observe that he spent much time in the invention of an universal language; but did not live to complete his design. In 1710 he published "A Dissertation on the Goodness of God, the Liberty of Man, and the Origin of Evil." The writings of Leibnitz had long rendered his name famous in every part of Europe: he had honours bestowed upon him by several other princes, besides the elector of Hanover and Brandenburg, and in 1711 he was made Aulic counsellor to the emperor, and at the same period the czar Peter the Great appointed him privy counsellor of justice, with a pension of a thousand ducats. In 1714 his patron, the elector of Hanover, was raised to the throne of Great Britain, and in a short time Leibnitz passed over to England, where he received new marks of favour and friendship, and frequently made his appearance at court. It was during this visit, that, at the desire of the prince of Wales, afterwards queen Caroline, he engaged in a dispute with the celebrated Dr. Samuel Clarke, upon the subject of free will and other important metaphysical topics. This controversy continued till the death of Leibnitz, which event took place in 1716. He was author of many other works besides those already mentioned. His intellectual abilities and attainments entitle him to be ranked among those universal geniuses which at once surprize and benefit the world. With great strength of understanding, an excellent faculty of invention, and a most capacious and retentive memory, he united an uncommon degree of industry. Hence he was enabled not only to acquire much general knowledge, but to become eminent in

attainments of various kinds. The improvements which he made in the higher geometry and algebra, rank him among mathematicians of the first class. He thoroughly understood the doctrines of philosophy, both ancient and modern, and cast new light upon almost every branch of knowledge. In theology he was well read in the writings of the Christian fathers, and in the controversies of his own times. On history and jurisprudence he wrote in such a manner as might lead a reader to suppose that these subjects were his chief or only study. The philosophy of Leibnitz is a system formed partly on the Cartesian, and partly in opposition to the Newtonian theory. After the dispute respecting the discovery of fluxions, he became the violent opposer of our great philosopher. He even charged his system with having an impious tendency, because it asserted that the fabric of the universe, and the course of nature, would not continue for ever in its present state, but would require, in process of time, to be re-established, or renewed by the hand of its former. According to his own principles, deduced, as he thought, from the wisdom and goodness of the deity, and his principle of a sufficient reason, he concluded the universe to be a perfect work, or the best that could possibly have been made; and that other things, which are evil or inconvenient, were permitted as necessary consequences of what was best; that the material system, considered as a perfect machine, can never fall into disorder, or require to be set right; and that to suppose that God interferes in it, is to lessen the skill of the author, and the perfection of his work. Among many other of his notions (for an account of which see *LEIBNITZIAN Philosophy*) we may add this, that the acts of the soul and body proceed by necessary laws: the soul in its perceptions and volitions, and the body in its motions, without affecting each other; but that each is to be considered as a separate independent machine. The volitions of the mind are followed instantly by the desired motions of the body, not in consequence of those volitions in the least, but of the nice and well-adjusted machinery of the body. The impressions produced in the sensory have no effect on the mind, but the corresponding idea arises at that precise time, in consequence of a chain of causes of a different kind. Moreri, Maclaurin, &c. See *LEIBNITZIAN Philosophy*.

*LEIBNITZ*, in *Geography*, a town of Saxony, in the margravate of Meissen; 4 miles S. of Dresden.—Also, a town of the duchy of Stiria, on the Sulm; 16 miles S. of Gratz.

*LEIBNITZIAN PHILOSOPHY*, or the philosophy of Leibnitz, is a system of philosophy formed and published by its author in the 17th century, partly in emendation of the Cartesian, and partly in opposition to the Newtonian. The basis of Mr. Leibnitz's philosophy was that of Des Cartes; for he retained the Cartesian subtle matter with the universal plenitude and vortices; and represented the universe as a machine that should proceed for ever, by the laws of mechanism in the most perfect state, by an absolute inviolable necessity, though in some things he differs from Des Cartes. After Sir Isaac Newton's philosophy was published in 1687, he printed an essay on the celestial motions (*Act. Erud.* 1689), where he admits of the circulation of the ether with Des Cartes, and of gravity with Sir Isaac Newton; though he has not reconciled these principles, nor shewn how gravity arose from the impulse of this ether, nor how to account for the planetary revolutions and the laws of the planetary motions in their respective orbits. That which he calls the harmonical circulation is the angular velocity of any one planet, which decreases from the perihelium to the aphelium in the same proportion as its distance from the sun increases;

but this law does not apply to the motions of the different planets compared together; because the velocities of the planets, at their mean distances, decrease in the same proportion as the square roots of the numbers expressing those distances. Besides, his system is defective, as it does not reconcile the circulation of the ether with the free motions of the comets in all directions, or with the obliquity of the planes of the planetary orbits; nor resolve other objections to which the hypothesis of the plenum and vortices is liable. Soon after the period just mentioned, the dispute commenced concerning the invention of the method of *fluxions* (which see), which led Mr. Leibnitz to take a very decided part in opposition to the philosophy of Sir Isaac Newton. See *LEIBNITZ*.

The perfection of the universe, by reason of which it is capable of continuing for ever by mechanical laws in its present state, led Mr. Leibnitz to distinguish between the quantity of motion and the force of bodies; and, whilst he owns, in opposition to Des Cartes, that the former varies, to maintain that the quantity of force is for ever the same in the universe, and to measure the force of bodies by the squares of their velocities. See *FORCE*.

This system also requires the utter exclusion of atoms, or of any perfectly hard and inflexible bodies; the advocates of it allege, that, according to the law of continuity, as they call a law of nature invented for the sake of the theory, all changes in nature are produced by insensible and infinitely small degrees; so that no body can, in any case, pass from motion to rest, or from rest to motion, without passing through all possible intermediate degrees of motion; whence they conclude that atoms or perfectly hard bodies are impossible: because if two of them should meet with equal motions, in contrary directions, they would necessarily stop at once, in violation of the law of continuity.

Mr. Leibnitz proposes two principles as the foundation of all our knowledge; the first, that it is impossible for a thing to be, and not to be, at the same time, which, he says, is the foundation of speculative truth: the other is, that nothing is, without a *sufficient reason* why it should be, rather than otherwise: and by this principle, according to him, we make a transition from abstracted truths to natural philosophy. Hence, he concludes, that the mind is naturally determined, in its volitions and elections, by the greatest apparent good, and that it is impossible to make a choice between things perfectly like, which he calls *indiscernibles*; from whence he infers, that two things perfectly like could not have been produced even by the Deity: and he rejects a vacuum, partly because the parts of it must be supposed perfectly like to each other. For the same reason also he rejects atoms, and all similar particles of matter: to each of which, though divisible in *infinitum*, he ascribes a *monad* (*Act. Lipsiæ* 1698, p. 435.), or active kind of principle, endued, as he says, with perception and appetite. The essence of substance he places in action or activity, or, as he expresses it, in something that is between acting and the faculty of acting. He affirms absolute rest to be impossible, and holds motion, or a sort of *nîsus*, to be essential to all material substances. Each monad he describes as representative of the whole universe from its point of sight; and after all, in one of his letters he tells us, that matter is not a substance, but a *substantiatum*, or *phenomenè bien fondé*. (See *MONAD*.) He frequently urges the comparison between the effects of opposite motives on the mind, and of weights placed in the scale of a balance, or of powers acting upon the same body with contrary directions. His learned antagonist Dr. Clarke denies that there is a similitude between a balance moved by weights, and a mind acting upon

upon the view of certain motives; because the one is entirely passive, and the other not only is acted upon, but acts also. The mind, he owns, is purely passive in receiving the impression of the motive, which is only a perception, and is not to be confounded with the power of acting after, or in consequence of, that perception. The difference between a man and a machine does not consist only in sensation and intelligence; but in this power of acting also. The balance, for want of this power, cannot move at all, when the weights are equal; but a free agent, he says, when there appear two perfectly alike reasonable ways of acting, has still within itself a power of choosing; and it may have strong and very good reasons not to forbear. Collection of Papers which passed between Mr. Leibnitz and Dr. Clarke in 1715 and 1716, &c. Svo. 1717, p. 121. See LIBERTY.

The translator of Mosheim's Ecclesiastical History observes, that the progress of Arminianism has declined in Germany and several parts of Switzerland, in consequence of the influence of the Leibnitzian and Wolfian philosophy. Leibnitz and Wolf, by attacking that liberty of indifference, which is supposed to imply the power of acting not only without, but against motives, struck, he says, at the very foundation of the Arminian system. He adds, that the greatest possible perfection of the universe, considered as the ultimate end of creating goodness, removes from the doctrine of predestination those arbitrary procedures and narrow views, with which the Calvinists are supposed to have loaded it, and gives it a new, a more pleasing, and a more philosophical aspect. As the Leibnitzians laid down this great end as the supreme object of God's universal dominion, and the scope to which all his dispensations are directed; so they concluded, that, if this end was proposed, it must be accomplished. Hence the doctrine of necessity, to fulfill the purposes of a predestination founded in wisdom and goodness; a necessity, physical and mechanical, in the motions of material and inanimate things, but a necessity, moral and spiritual, in the voluntary determinations of intelligent beings, in consequence of prepotent motives, which produce their effects with certainty, though these effects be contingent, and by no means the offspring of an absolute and essentially immutable fatality. These principles, says the same writer, are evidently applicable to the main doctrines of Calvinism; by them predestination is confirmed, though modified with respect to its reasons and its end; by them irresistible grace (irresistible in a moral sense) is maintained upon the hypothesis of prepotent motives and a moral necessity; the perseverance of the saints is also explicable upon the same system, by a series of moral causes producing a series of moral effects. Mosheim's Eccl. Hist. by Dr. Maclaine, vol. v. p. 464. Svo. edit.

For an account of Leibnitz's famous doctrine of a *pre-established HARMONY*, we refer to that article; and for his account of monads to MONADS.

See on the subject of this article Maclaurin's view of Sir Isaac Newton's Philosophical Discoveries, &c. book i. chap. 4. or p. 79, &c. 4to edit. Brucker's History of Philosophy, by Enfield, vol. ii. p. 556, &c.

LEICESTER, commonly pronounced *Lester*, in Geography, the county town of Leicestershire, England, was formerly written *Lege-cætria*, *Legeocæster*, and in the Saxon Annals *Leger-cæster*; and during part of the heptarchy it was a city. Without referring it to a British origin, or entering into a discussion respecting the derivation of its name, and of its civil privileges from king Leir, it will amply satisfy every rational enquirer to commence its history at that period when the Romans had settled themselves

in this island, and held the natives in military subordination. As those conquerors marched from the south-east, towards the central and northern parts of the country, they could not have obtained possession of this district, till the intermediate places between it and the sea were subjugated, and competent garrisons established. Having accomplished this, and overpowered the Coritani, they took possession of the chief town of that people. This town, or strong hold, was the seat of the present Leicester, and, at the time of its conquest, was denominated *Ratæ* in the Itineraries of Richard, Antoninus, and Ravennas; but *Ragæ* in other writings. "The real name, therefore," says Mr. Whittaker, "must be equally *Ratæ* and *Ragæ*; the former implying the town to be fixed upon the currents, the latter importing it to be the capital of the kingdom." That the Romans had a permanent station here is unequivocally manifested by the tessellated pavements, and other remains that have been discovered at different periods; and, according to Antoninus, *Ratæ* was one of their stipendiary towns. The fofs-road in its way from Londinio, London, to Lindum, Lincoln, came by Venone; whence to *Ratæ* was twelve miles, and thence to Verometum thirteen miles; and these distances very nearly correspond with those between Claycheſter, Leicester, and Willoughby. That this station was formed on the northern bank of the Soar, that an artificial channel was cut for the water to flow up to, and constitute one boundary of the station, and that the Romans were settled here for some length of time, are circumstances easily proved, as ample evidences remain, and are recorded in support of these inferences. Many tessellated pavements, coins, urns, and other domestic and military relics of the Romans, have been discovered at different times: some of which are still carefully preserved as memorials of ancient art, but many of the most interesting objects must have been destroyed during the ravages of war which Leicester experienced under the Saxons, Danes, and Normans. Of the Mosaic pavements, that which was found in a cellar nearly opposite the town-prison, in the year 1675, is the most worthy of notice. But the most curious relic of antiquity, and one that has provoked the most copious dissertations, is the *milliary*, or Roman milestone, which was discovered in 1771, on the side of the Fofs-road, at the distance of about two miles north of the town, and thence removed into the town at the expence of the corporation: by this stone the station of *Ratæ* is clearly defined. In different parts of the town, and at distant periods of time, a great number of Roman coins have been found: among which were several with the names of Titus, Trajan, Dioclesian, Constantine the Great, Constantine Junior, Constantian, Hadrian, Theodosius, Honorius, &c. Here is also a curious fragment of Roman architecture, commonly called the Jewry wall; consisting of a mass of brick-work, stones, and rubbish, with dilapidated arches turned entirely of tiles, bound together by a large quantity of mortar. About a quarter of a mile south of the Infirmary are some artificial banks, known by the name of *radynes*, or *rasudykes*: these were formerly about four yards in height, and consisted of two parallel mounds of earth, extending 67 yards in length, at the distance of fifteen yards from each other. If these remains are not peculiarly worthy notice as works of art, they are curious as vestiges of remote times, and of a particular people.

The history of Leicester, during the Saxon heptarchy, is very vague and uncertain, though, from the concurrent testimony of all writers, it was certainly a place of considerable note from the departure of the Romans to the time of the Norman conquest. According to Godwin, a bishop's see was transferred from Sidnaceſter to Leicester in the year

## LEICESTER.

737. At this period the Saxon kingdom of Mercia had, according to some authors, three episcopal sees: Lichfield, Dorchester, and Leicester. From the Saxon annals, it appears that Ethelfrid, king of Northumberland, being an avowed enemy to Christianity, marched an army to Leicester, where he made a great slaughter of the inhabitants. Jowallensis relates that Ethelred, king of Mercia, and his queen Elfreda, who was daughter of Alfred the Great, repaired the town about the year 907, and rebuilt and enlarged the walls, which were now made to inclose the castle; previous to that period the castle appears to have been on the outside of the town. On the conquest of England by William the Norman, Leicester soon became part of the royal demesne, and a castle was either newly erected, or enlarged and strengthened to ensure the submission of the inhabitants, and those of the surrounding country. On the death of the conqueror, Leicester citadel, being held by the adherents of duke Robert, was nearly demolished by the successful partizans of William Rufus. In the reign of Henry I. Robert, earl of Leicester, repaired, enlarged, and fortified the castle, which he made his principal residence. He was very liberal to the town; as was also his son Robert Boflu; but the arrogant behaviour of the latter to the king involved this place in broils and war; it being the practice in those times for sovereigns to revenge themselves, for the offences of the nobles, on the people and places immediately under the patronage of the offenders. This was fatally experienced in the reign of Henry II. when earl Robert Blanchmaius, leaguely with the king's son in his unnatural rebellion, Leicester, the chief resort of the disaffected, was, after a long siege, almost destroyed, and the castle reduced to a heap of ruins. Scarcely any thing now remains of the latter building, but an artificial mound, or the earth work of the keep, near which is a part of the town with some ancient buildings, called "the Newark," or New-work. This name appears to have been given to distinguish it from the castle with its original buildings, which was considered as the old works. The Newark is said to have been founded by Henry, third earl of Lancaster, and his son Henry, the first duke of that name. By these two noblemen some large buildings were erected here; and John of Gaunt, who was earl of Leicester, added considerably to the pile. When completed, the whole must have formed a grand display; but nearly all of these have fallen beneath the devastating hand of man, and the slowly devouring tooth of time. From the remains of the surrounding walls, it is presumed that the Newark was an inclosed area, bounded on the north by the castle, on the south by fields, to the west by a branch of the river Soar, and to the east by a street of the suburbs. At this side is still remaining a large castellated gateway, called the *magazine*, which name it obtained in 1682, when it was purchased by the county, and applied to the use of the train bands. Throby says it "was built with the New-works, by the founder of the hospital and collegiate church." This gateway has a large pointed arched entrance with a small postern door way, and communicates with an area nearly surrounded with buildings.

Among the ancient religious houses and foundations of this town, the abbey was formerly of great local importance; but its buildings are nearly levelled with the earth which covers the abies of its inhabitants. It is said to have been founded in the year 1143 by Robert Boflu, earl of Leicester, who became one of the regular canons on his own foundation. The abbey soon acquired celebrity, and obtained numerous privileges. It was possessed of lands in thirty-six parishes in and about Leicester, and in most of the manors in this and many other counties. Several kings

of England, and other distinguished personages, were entertained and lodged at this house in a grand and sumptuous style. The once great and magnificent cardinal Wolsey died at this abbey, November 29th, 1530.

In this town was formerly a *mintage*; and the series of coins that have been collected, prove that at the Leicester mint, a regular succession of coinage has been produced from the reign of the Saxon king Athelstan down to Henry II. This series has been engraved in Mr. Nichols's valuable history of this town.

The first charter granted to Leicester was by king John in the first year of his reign; and at the same time Robert Fitz-Parnel, earl of Leicester, invested the burgesses with the power of buying and selling lands, &c. A charter, granted in the following reign by earl Simon de Montfort, shews the peculiar intolerance of the times; it specifies that "no Jew, or Jewess, in my time, or in the time of any of my heirs, to the end of the world, shall inhabit, or remain in" the town of Leicester. Henry VII. by charter dated 1504, confirmed all the previous privileges, and empowered the justices to take cognizance of treasons, murders, felonies, &c. A charter by queen Elizabeth specifies that the borough of Leicester is very ancient and populous, and from remote times has been a borough incorporate; and the former liberties and immunities are specified and extended. The corporation are thereby empowered, among other privileges, to refuse the building of malt-kilns within the distance of thirty yards from any other building. This charter also grants a market for wool-yarn and worsted, and for other commodities. All fines and amerements were ordered to be applied to the use of the poor. The corporation consists of a mayor, recorder, steward, bailiffs, twenty-four aldermen, forty-eight common-councilmen, and a town clerk; the freemen are toll-free of all the markets and fairs in England. As a parliamentary borough, Leicester has returned two members to the national councils from the time of Edward I. One of the representatives was formerly elected by the "mayor and his brethren," and the other by the commonalty. This mode having excited much popular disturbance, Henry VII. ordained that "the mayor and his brethren should choose forty-eight of the most discreet inhabitants of the town," who should elect all officers for the borough, and members of parliament. Thus it continued till the reign of Charles II.; from which time the right of election has been vested in "the freemen, not receiving alms, and in the inhabitants paying foot and lot." The number of voters is about 2000.

At the time of the Norman conquest, there appear to have been six churches in this town; and it would be highly interesting to the architectural antiquary to ascertain if either of the present structures contains any part of the building then standing. Of the religious edifices now remaining, St. Nicholas's church is esteemed the most ancient. It stands contiguous to the Jewry wall, and appears to have been partly constructed with the bricks, tiles, &c. taken from the fallen parts of that building; whence some antiquaries have thought that they are both parts of the same structure, or built about the same period. The church of St. Mary, distinguished by the addition of *infra* or *juxta* castrum, is a large pile of irregular building, composed of various specimens, or styles of architecture, from a very early period to a late one, when all styles were disregarded. These varieties tend to mark "the disasters of violence, accident, and time," and prove that the neighbourhood of the castle, within the outer ballium, or precinct of which it stood, was often most dangerous. That there was a church on this spot in the Saxon times seems almost certain, from some bricks, apparently

apparently the workmanship of that people, found in the chancel; and the chevron work round the windows of the chancel proves that the first Norman earl of Leicester, Robert de Bellomont, constructed a church on a plan nearly like the present, and adorned it with the architecture of his time. The interior of this church is spacious; and on the south side of the nave is a singularly large semicircular arch, having a span of thirty-nine feet. The fourth aisle is said by Mr. Carte to have been built by John of Gaunt. At the east end of this aisle was a chapel, or choir, held by guild, or fraternity, called the Trinity guild. This was founded, in Henry VIIIth's reign, by sir Richard Sacheverele, and the good lady Hungerford. Respecting this guild, the following list of articles, bought in for the year 1508, will serve to shew the value of money, and prices of provisions at that period. "A dozen of ale, 20*d.*; a fat wether, 2*s.* 4*d.*; seven lambs, 7*s.*; fourteen goslings, 4*s.* 8*d.*; fifteen capons, 5*s.*; half a quarter of malt, 2*s.*; four gallons of milk, 4*d.*; a pig, 5*d.*" At the west end of the church is a handsome tower, surmounted by a lofty and elegant spire. The latter has twice suffered from storms. Near the north door of this church is a passage leading under an old building which forms a gateway to an area called the castle yard. Opposite this gateway is a building, partly ancient, partly modern, within which is a large hall seventy-eight feet in length, fifty-one in width, and twenty-four feet high. This hall, during the reign of Lancastrian princes, was the scene of frequent parliaments; at present it is used only for holding the assizes and other county meetings. The church of All Saints is a small modern structure, consisting of a nave and two aisles, all nearly of the same length. The church of St. Martin, formerly called St. Cross, is a large old building, consisting of a nave, three aisles, and a tower, with a lofty crocketed spire. This church, being the largest in the town, and even in the whole county, is used at all the public meetings of the district for the bishop, judges, &c. The churchwardens' accounts respecting this church and parish are copious and well preserved. They begin in 1544, and contain many curious notices, descriptive of the peculiar manners and customs of the different times. In this church was held St. George's guild, a fraternity which was invested with peculiar privileges, and annually ordained a sort of *jubilee* in the town, called "the Riding of St. George." It contained also another guild called Corpus Christi, which Mr. Throsby says, "was the most ancient and principal in Leicester." The register of this parish records the calamitous effects of a plague which raged here in the years 1610 and 1611, during which period 166 persons were buried. In the marriage register is an entry of the names of Thomas Tiley and Ursula Ruffel, the first of whom being "deafe and also dombe," it was agreed by the bishop, mayor, and gentlemen of the town, that certain signs and actions of the bridegroom should be admitted instead of the necessary words. St. Margaret's church, according to Leland's account, is "the fairest church in that place, which once was a cathedral church, and near which the bishop of Lincoln hath a palace, whereof little yet standeth." This edifice consists of a nave, side aisles, chancel, and a handsome tower, and was annexed as a *prebend* to the college of Lincoln by the bishop of that diocese, at the time when the other churches were given to the abbey. Besides these churches, here are chapels or meeting-houses for different sects of dissenters, presbyterians, independents, and baptists. The county gaol, erected in the year 1791, at the expence of six thousand pounds, occupies the site of an old prison, and is built after the plan recommended by Mr. Howard, with solitary cells, &c. The town gaol is a commodious stone building, de-

signed by Mr. Johnson, a native of this town, and executed by Mr. Firmadge in 1792. The other public buildings are a free grammar school of great antiquity; several charity schools; various hospitals; an asylum for indigent lunatics; an exchange for public business; the hotel, now used as assembly rooms; and a commodious theatre. Among the curiosities of the town, is the old wooden bedstead said to have belonged to king Richard, and on which he slept, or rather reclined, the night preceding the battle of Bosworth.

The principal, and almost only article of manufacture in Leicester, is that of stockings, which has been an established and staple commodity here for above two centuries. It finds employment for a great number of persons, as hosiery, stocking-makers, wool-combers, dyers, frame-smiths, comb-makers, winders, sizers, seamers, spinners, hobbiners, sinker-makers, stocking-needle-makers, &c. &c. Mr. Throsby states that in Leicester there were "upwards of seventy manufacturers, called hosiery, who, it is computed, employ 3000 frames; including the wrought goods they individually purchase; about 6000 persons being directly or indirectly employed in this great business." This town and its vicinity, with Nottingham and its neighbourhood, are the principal places in England for the manufacture of stockings; the latter is the most noted for silk, and the finer sort of goods, while the former is chiefly devoted to the coarser articles, of which a very large quantity is annually made. The trade at present is very flourishing, and in the "Walk through Leicester" it is stated "that 15,000 dozen per week" of stockings are made on an average. (See *STOCKINGS*.) Leicester is 97 miles distant from London: the market is held on Saturdays; and seven fairs annually; all on a very large scale. This town was returned to parliament in the year 1801 as containing 3290 houses, and 16,953 inhabitants.

Among the natives of this town, of literary eminence, is Dr. Richard Farmer, who was born in 1735, and died in 1797. Nichols's *History and Antiquities of Leicestershire*, seven vols. folio. A Walk through Leicester, 12mo. is an interesting and well written topographical work.

LEICESTER, a township of America, in Addison county, Vermont, situated on the east side of Otter creek, containing 522 inhabitants.

LEICESTER, called by the Indian natives *Towatid*, a considerable post-town in Worcester county, Massachusetts, containing 1103 inhabitants; situated upon the post-road from Bolton to Hartford, New York, and Philadelphia; 6 miles W. of Worcester, and 54 W. by S. of Bolton; settled in 1703, and incorporated in 1720 or 1721. It has three meeting-houses for Congregationalists, Anabaptists, and Quakers; and an academy incorporated in 1784, and well endowed. Wool-cards are manufactured in this town.

LEICESTERSHIRE, called in the Domesday Survey *Leicestre-shire*, is an inland county, situated nearly in the middle of England, and environed by the counties of Rutland and Lincoln to the east, Nottingham and Derby on the north, Staffordshire and Warwickshire to the west, whilst part of the latter county and Northamptonshire attach to the southern border. A part of the great Roman road, called Watling-street, appears to have formed a regular division between Leicestershire and Warwickshire. The district included within these boundaries was, at an early period, a part of the territory belonging to the Coritani. After the Romans had subjugated the Britons, and had established colonies in different parts of the island, this county was included within the province of Flavia Caesariensis, and had military stations established at Ratæ (Leicester); Veru-

## LEICESTERSHIRE.

metum, on the northern border of the county; Benouæ, near High-Crofs; and Manduëddum, at Mancester. Thefe ftations were connected by regular artificial roads, or military ways, known by the names of Watling-Street, Foffe-Way, and Via Devana. The firft enters this county at Dow-bridge or Dovebridge, on the Northamptonshire border, where the ftation called Tripontium was fixed: hence to Manduëddum it called nearly in a ftraight line, having the fmall ftation of Benouæ on its courfe. Near this place the Foffe-Way intersects it at right angles, and paffes on to Ræte; whence it continues in a northerly direction to Ver-nometum, and thence on to Margidunum, a ftation near Eaft Britford, in Nottinghamshire. After the Romans had evacuated the ifland, this diftrict became part of the kingdom of Mercia; and when the fubdivision of the Anglo-Saxon provinces into counties was eftablifhed, and bifhops' fees created, the town of Leicefter was conftituted the feat of the diocefan. The Mercian kingdom was divided into fouthern and northern; and the inhabitants of Leicefterfhire were denominated Mediterranean, or Middle Angles. They were frequently haraffed by the invading Danes, who entering the diftrict from the eaftern coaft, laid the whole country under contribution between the German ocean and Leicefter; and having conquered this place, eftablifhed themfelves here for fome length of time: indeed, Leicefter was confidered as one of their five chief cities in the ifland. After the Norman invafion in 1066, Leicefterfhire experienced a complete revolution in its civil and manorial privileges; as the conqueror divided it among his relations and adherents. Two hundred and twenty-eight lordfhips, the chief parts of the county, were allotted and parcelled out to different Norman chiefs; who again regranted various allotments to their followers and dependants, to be held of them by knight's fervice. The king, the archbifhop of York, and the bifhops of Lincoln and Conftance, were alfo poffeffed of landed property in the county; and fome was annexed to the abbies of Peterborough, Coventry, and Croyland. The Norman chiefs, in order to fecure their newly-acquired poffeffions, foon built, on their refpective eftates, ftrong and magnificent caftles, which might at once fecure themfelves, and keep the conquered English in awe. The feveral townfhips, in which fuch caftles are known to have been created, with the names of the founders, are Leicefter, Mount Sorel, Whitwick, and Shilton, founded by the earls of Leicefter; Groby and Hinckley, by Hugo de Grentemaignell; Donington, by Eulface baron of Halton; Melton, by Roger lord Mowbray; Ravenon, by Goeffrid Hanfelin; Sauvey, by lord Baffet of Weldon; and Thorpe, by Ernard de Bois. Moft of thefe caftles, during the unequal reigns of Henry II., John, and Henry III., being held by the rebellious barons, and rendered receptacles of thieves and freebooters, were, by command of the latter king, utterly demolifhed; and though fome of them were afterwards rebuilt, yet at this day there is not one of them remaining entire, and even the ruins of moft of them are entirely defaced. The Norman chiefs, after fettling their poffeffions, and fortifying themfelves within their refpective domains, next directed their attention to the religious habits and prejudices of the times; as to fecure the favour and influence of the monks, in an age when they were almoft omnipotent, or at leaft could command and intimidate the whole community, was a neceffary branch of military policy, which the provincial barons neither overlooked nor neglected. Accordingly, part of their eftates were appropriated to the foundation of abbies, priories, nunneries, and other monaftic eftablifhments. In this county were founded four abbies, at Croxton, Garendon, Leicefter, and Olvefton; twelve priories, at Belvoir,

Bradley, Bredon, Charley, Hinckley, Kirkby Beler, Laund; at Leicefter were four, for Eremites, Black Friars, Grey Friars, and Auftin Friars; and Ulvefton; two nunneries at Grace Dieu and Langley; two collegiate churches in Leicefter; and various free chapels, hofpitals, preceptories, and chantries, in different parts of the county.

At the time of compiling that great national work, the Domefday Survey, Leicefterfhire was divided into four wapentakes or hundreds; Framland, Guthlaxton, Gartre, and Gofcote: and thus it continued till the 20th of Edward III., when an additional hundred, Sparkenhoe, was taken out of Guthlaxton; and afterwards Gofcote was divided into two, denominated, from their fituations, Eaft and Weft Gofcote. In thefe fix hundreds are 196 parifhes, and 12 market-towns, *viz.* Leicefter, Aftby de la Zouch, Bofworth, Hal-laton, Harborough, Lutterworth, Melton Mowbray, Mount Sorel, Billefdon, Hinckley, Loughborough, and Waltham on the Wold. The whole county is within the ecclefiaftical jurifdiction of the fee of Lincoln, and in the province of Canterbury; under one archdeacon, and fix deaneries. Mr. Nichols ftates, from the Domefday Survey, that the whole county, at the time that record was compiled, contained 34,000 inhabitants. The number returned to parliament, under the population act of the year 1800, was 130,081; of whom 23,823 are ftated to be employed in agriculture, and 42,036 in trade and manufactures: the number of houfes being 26,734. The representatives in parliament are but four: two for the county, and two for the borough of Leicefter. The circumference and extent of the county have not been fatisfactorily defined. Mr. Nichols ftates the former to be "about 150 miles;" whilft Mr. Monk fetts the fame down at "about 96 miles." The fuperficial contents are eftimated at about 540,000 acres.

This county has not any rivers of importance; but thofe which pafs through it are convenient and ornamental. The chief are the Soar, the Swift, the Welland, the Avon, the Wreke, and the Anchor. The Soar, anciently called Leire, which is the largeft of thefe, rifes from two heads or fources in the fouth-weftern part of the county, and, after receiving a fmall tributary ftream near Whetstone, paffes by the weft and north fides of the town of Leicefter.

Leicefterfhire being more an agricultural than a commercial diftrict, and deprived of any particular mines, has not equally participated with many other English counties in canal navigation. Some plans for this purpofe have been projected at different periods, and a few have been executed. In 1782, a bill was brought into parliament for making a navigable canal from Chilver's Coton in Warwickfhire, to pafs through a great part of Leicefterfhire; but being opposed by a variety of interefts, it failed of fuccefs. In 1780, another bill was introduced for opening a canal communication between Loughborough and Leicefter; but it was thrown out on the fecond reading. In 1791, another application was made with better fuccefs; and an act was obtained for making the faid communication: the proprietors are ftyled in this act, "the company and proprietors of the Leicefter Navigation." In the fame year, another act was obtained for making navigable the rivers Wreke and Eye: and in 1793, a bill was paffed for making the "Oakham Canal," from a town of that name in Rutlandfhire, to Melton Mowbray.

The whole of Leicefterfhire preffents nearly a flat furface, and is chiefly appropriated to the grazing fystem. It has obtained peculiar celebrity, among agriculturifts, for a breed of fheep, diftinguifhed by the name of the Shire: and the late Robert Bakewell of Difhley, acquired for himfelf and the county much popularity, by the experiments and

and improvements he made in the breed of cattle and sheep. Among the different breeds of sheep in the county, the Old Leicester, the Forest, and the New Leicester, or Dishley, constitute the principal flocks, and of them the latter is in the highest repute. The extraordinary price for which many of the New-Leicester-sheep have been sold at public auctions, and the large fums for which some of the rams and bulls have been let out for the season, serve at once to shew their estimation in public opinion, and the laudable zeal that prevails for improving the breeds of cattle, &c. At an auction of ewes, belonging to Thomas Pagett, esq., in the year 1793, the following fums were given:—Five ewes, at 62 guineas each; five, at 52 guineas each; five, at 45 guineas each; ten, at 30 guineas; and several at 25, 20, and 16 guineas each. One of these sheep, which was killed at Walgrave in Northamptonshire, was of the following weight: the carcase 144lb., blood 5lb., fat 16½lb., head and entrails 12lb., skin 18lb.; making in the whole 195½lb. It is no uncommon thing to fald down the mutton as a substitute for bacon. In the year 1793, Mr. Pagett fold several bulls, heifers, cows, and calves, by public auction, when some were bought at the following very extravagant prices: a bull, called "Shakspere," described in the catalogue as "bred by the late Mr. Fowler) by Shakspere, off young Nell. Whoever buys this lot, the seller makes it a condition, that he shall have the privilege of having two cows bulled by him yearly"—Four hundred guineas: a bull calf 31 guineas; a three years old heifer 70 guineas; others at 35 and 32 guineas each; a two years old heifer at 84, and another at 60 guineas.

It will be difficult to define the soils of the whole county. Very little of the land can with propriety be called a mere sand or gravelly soil; nor is there any great quantity that may properly be called clay. The best soil is upon the hills; and the worst, or nearest approaching to the clay or cold lands, in the vallies; though there are many exceptions to this rule. The soil, or what the farmers generally call *mould*, is generally deep, which makes it very proper for grafs; such deep soils not being very soon affected by dry weather. About Lutterworth, some part is a light rich loam, excellent for turnips and barley; a part stiff, inclining to marle, or rich clay; the remainder, chiefly a fort of medium between both, with a subsoil inclining to marle, bearing excellent crops of oats and wheat, and good turnips also, though not so well adapted for being eat off the land by sheep. Molt of the land round Hinckley is a good mixed soil, bearing good crops of grafs. Ahyde-la-Zouch, and the northern parts of the county, exhibit various soils, sand, gravel, loam, and clay. In Melton Mowbray the soil is in general a heavy loam; and immediately underneath a very stiff impervious clay, mixed with small pieces of lime-stone. These lands are very wet in winter, and the turf so tender, as scarcely to be able to bear the treading of sheep, without injury. At Market Harborough the soil is in general a very strong clay, chiefly in grafs.

Since the commencement of the last century, cheese has become an article of some importance to the Leicestershire farmers; and a large cheese-fair is annually held in the county-town. Among the different sorts manufactured in the county, that called Stilton cheese is deemed the finest, and consequently obtains the highest price. It acquired the title of Stilton from a place of that name, on the great North road in Huntingdonshire, where it is well known to have been first publicly sold by retail. This cheese is sometimes called the Parmesan of England, and is usually formed in square vats. The cheeses seldom weigh more than twelve

pounds each, and from that to six pounds is the general average weight. They are sometimes moulded in nets, but this mode is not deemed so eligible as that of the vat. A considerable quantity of this cheese is made on the farms about Melton Mowbray.

Leicestershire is described by Mr. Marshall, in his "Rural Economy," as a very fertile district; and the only parts which are not absolutely in good cultivation, are Charnwood-Forest, also a tract of land in the northern part of the county, called the Wolds or Woulds, and another similar tract on the southern side. Nichols's History and Antiquities of Leicestershire, 7 vols. folio.

LEIDENS DORF, a town of Bohemia, in the circle of Leitmeritz; 20 miles W. of Leitmeritz.

LE JEUNE, in *Biography*. See CLAUDE.

LEIGE, See LIEGE.

LEIGH, Sir EDWARD, in *Biography*. See born at Shadwell, in Leicestershire, in the year 1602. He received the rudiments of learning at Walsal, in Staffordshire, and in 1616 was entered a commoner of Magdalen-hall, in the university of Oxford. From the university, he went to study the common law in the Middle Temple. When the plague broke out in 1625, he went into France for a short time, and returning thence, he applied himself most sedulously to his studies, which comprized not only the law, but divinity, history, and the learned languages. During the civil wars he was chosen member of parliament for the town of Stafford, and was one of the persons appointed to sit in the assembly of divines. He was greatly distinguished for the talents and learning which he displayed in the debates of that assembly. In the year 1648, when the Presbyterian party was excluded from the house by the army, he was in the number of proscribed members, and was for some time kept in confinement. From the period of his liberation till the restoration, he chiefly employed himself in prosecuting his literary studies, and in publishing various works, which discover profound erudition and general knowledge. He died in 1671, at the age of 69. He was author of "Selected and choice Observations concerning the twelve Cæsars;" "Analecfa Cæsarum Romanorum;" "A Treatise of divine Promises;" "Critica Sacra," in 2 vols. 4to; "Annotations on all the Books of the New Testament;" "A Philological Commentary, or an Illustration of the most obvious and useful Words in the Law;" "A System of Divinity;" "Annotations on the five poetical Books of the Old Testament, viz. Job, Psalms, Proverbs, Ecclesiastes, and Canticles;" "Choice Observations on all the Kings of England, from the Saxons to the Death of King Charles I." Gen. Biog.

LEIGH, CHARLES, a physician of the seventeenth century, was born at Grange, in Lancashire. He graduated at Cambridge, and afterwards practised in London with considerable reputation. He was admitted a member of the Royal Society in May 1685. He left the following works: "The Natural History of the Counties of Lancashire, Cheshire, and Derbyshire, &c." Oxford, 1630, folio. London, 1700, with plates. "Pththiologia Lancastrienfis, cum tentamine philosophico de Mineralibus Aquis in eodem comitatu observatis," London, 1694, 8vo. "Exercitationes quinque de Aquis Mineralibus, Thermis calidis, Morbis acutis, Morbis intermittentibus, Hydrope," ibid. 1697. "History of Virginia," drawn up from observations made during a residence in that country, London, 1705, 12mo.

LEIGH, *Wells*, in *Geography*, a market town in the hundred of West Derby, Lancashire, England, is situated six miles from Wigan, and 198 from London. The church

is a handsome structure, with a square tower; the body being supported by two rows of pillars. Leigh has a considerable manufacture of fustian and other cotton stuffs; and by its canal navigation, which communicates with the rivers Mersey, Dee, Ribbles, Ouse, Severn, Humber, Thames, Avon, &c. it carries on an extensive traffic. Coals are abundant; and the dairies round the town produce excellent cheese. The town, according to the official report in 1801, contained 277 houses, and 1429 inhabitants. A weekly market is held on Saturdays; and a fair on the 26th of April. The parish is of great extent, and contains the townships of Aitley, Bedford, Pennington, and Tyldesley, the hamlet of Shacklesley, and the chapelry of Chowbent, inhabited altogether by nearly 13,000 persons.

The chapelry of Chowbent has greatly increased in houses and population within the last 20 years. Its chapel, though regularly consecrated by the bishop of Sodor and Man, is exempt from episcopal jurisdiction, and the patronage is vested in the proprietor of Atherton Hall, which formerly was the seat of a family of that name, but is now the property of the Hon. T. Powis. The house, which was built by Gibbs, is large, and has a spacious cubical entrance hall. A plan of this mansion is given in the "Vitruvius Britannicus."

The township of Tyldesley has grown up with the manufactures of the county. A family of that name was seated here so early as the reign of Henry III. Of this family was Sir Thomas Tyldesley, who signalized himself during the troubles of Charles I.'s reign, and fell in the battle of Wigan lane, August 25, 1650. He was buried in Leigh church; and on a pillar near Wigan is fixed a brass plate, with an inscription to perpetuate his memory. Beauties of England, vol. ix.

LEIGH'S *Island*. See COCA-NUT *Island*.

LEIGHLIN, a bishopric of Ireland, in the province of Dublin, founded in 632, and united with Ferns in 1600. The united bishopric comprises the whole counties of Carlow and Wexford, with part of the Queen's county, Wicklow, and Kilkenny. There are 232 parishes in the union, forming 79 benefices, in which are 71 churches and six glebe houses. The cathedrals are small, and serve for parish churches. The residence of the bishop is at Ferns.

LEIGHLIN, *Old*, a village of Ireland, near the river Barrow, and in the county of Carlow, 2½ miles W. by N. from Leighlin bridge. It was incorporated in the year 1216, and continued to send members to parliament till the Union; and is still the seat of the cathedral church of the diocese.

LEIGHLIN *Bridge*, a post-town of Ireland, in the county of Carlow, on the river Barrow, over which it has a bridge, first built in the year 1320. It originated in a monastery, which, on the suppression of religious houses, was converted into a fort to protect the bridge; and lately, on account of the navigation of the Barrow, it has considerably increased, being now a thriving town. It is 45 miles S.S.W. from Dublin, on the Great Southern road, and six miles from Carlow.

LEIGHTON, ALEXANDER, in *Biography*, a Scotch presbyterian divine, was born at Edinburgh in 1587. He became noted for the sufferings which he endured in the reign of Charles I., on account of a work which he published, entitled "An Appeal to the Parliament; or Zion's Plea against Preacy." For this he was tried in the high-commission court, and being convicted, which, in those days, and in that court, was but another term for being accused, he was condemned to be imprisoned for life, and pay a fine

of 10,000*l.*: he was to be fet in the pillory twice, and to be whipt, have one of his ears cut off, one side of his nose slit, and be branded in the face with a double S.S. as a fower of sedition. When this savage sentence was passed on him, the cruel Laud exhibited signs of the most indecent joy, and publicly gave God thanks for it. Excepting the imprisonment for life, and the fine, the sentence was put into execution to the full extent. He was released by the Long Parliament after an imprisonment of ten years. His confinement and cruel usage had so impaired his health, that when he was released he had scarcely the power of walking, or seeing, or hearing. As a sort of remuneration for his troubles the parliament appointed him keeper of Lambeth palace, at that time converted into a prison. He died in 1644, infane. Toulmin's Neale's Hist. vol. ii.

LEIGHTON, ROBERT, a Scotch prelate in the seventeenth century, was son of the preceding. He was educated in Scotland, where he distinguished himself above his contemporaries, in all the branches of useful learning, particularly in the study of the scriptures. Having finished his course of academical studies he went to the continent for improvement, and spent some years in France. On his return he obtained Presbyterian ordination, and was chosen to a congregation at Newbattle, near Edinburgh. Very soon after his settlement at this place he conceived a dislike to the Presbyterian form and manner of church discipline, and chose rather a life of retirement than to attend at the presbytery. His main object was to instruct his flock in the principles and duties of religion and morality, urging them not to trouble themselves with religious and political disputes. In the year 1648, he declared himself for the engagement for the king, on account of which he would have exposed himself to much trouble, had not the earl of Lothian, who lived in his parish, proved his friend, and prevailed with the men in power not to molest him. At length, finding that he could no longer submit to the ecclesiastical impositions of the Presbyterians, and being unwilling to live in strife and contention, he resigned his parish in silence, and withdrew into retirement. Shortly after, he was chosen principal of the college of Edinburgh, the duties of which office he performed with great reputation during ten years. Upon the restoration, when it was determined to establish episcopacy in Scotland, Leighton was fixed on as a proper person for the mitre. He was consecrated, with other bishops, at Westminster; he would now gladly have promoted some plan for uniting the Presbyterians and Episcopalians, but was thwarted in all views on this subject. When he found that the government was determined to enforce conformity on the Presbyterians by the most rigorous measures, he laboured with all zeal to shew the impolicy of such proceedings; but he struggled ineffectually against the current, and all that he could do was to practise, in his own diocese, the moderation which he had recommended generally, and to set an edifying example to the rest of his dignified brethren. These, however, profited but little either from his advice or from the exemplary conduct which he manifested. He remonstrated with the king respecting the arbitrary proceedings of the ecclesiastical high-commission court, and more lenient measures were promised to be pursued with respect to Scotland. He begged permission to resign his see; but the king, so far from listening to the prayer of his petition, urged him to accept of the diocese of Glasgow, which was a more important bishopric, and one in which he might be more useful. To induce him to accept of this preferment, he was promised the assistance of the court in bringing about his favourite scheme of a comprehension of the Presbyterians. He accepted the see, but after a short time found himself

himself wholly unable to carry on his great designs of healing the divisions, and reforming the abuses in the church, and begged permission to retire into private life, which was at length granted him. He went to live in Suffex, where he occupied himself in doing all the good in his power. He died in 1634, at about the age of eighty. He was author of "Praelationes Theologicae:" "A Commentary on the first and second Chapters of the first Epistle of St. Peter;" and of "Sermons," including other pieces: to the volume of sermons, published in 1758, is prefixed a life of the author, to which the reader is referred for ample particulars of this excellent divine.

LEIGHTON, Sir WILLIAM, knight, one of the honourable pensioners, who seems to have been a dilettante of considerable erudition in music; he published, in 1614, "The Tears or Lamentations of a forrowful Soul," composed with musical airs and songs, both for voices and divers instruments. The best composers of the time contributed to this publication. See LAMENTATIONS.

LEIGHTON-BUZZARD, or *Beaufort*, in *Geography*, a market town and parish in the hundred of Manshead and county of Bedford, England, is situated on the banks of the river Ouse, 41 miles from London, and contained, according to the return made in 1800 to parliament, 387 houses and 1963 inhabitants, of whom 1014 were stated to be employed in trades and manufactures. The market, which is held on Tuesdays, is one of the most ancient in the county; the tolls were valued at 7*l.* per annum at the time of the Norman survey. Here are six annual fairs, of which two were granted in the year 1447. The principal antiquity in the town is a beautiful pentangular cross, built of stone, and situated in an open area near the market-house: it is supposed to have been erected about the beginning of the fourteenth century. It consists of two stories; and the whole height is thirty-eight feet. (For a particular description, with an engraving, see Britton's *Architectural Antiquities of Great Britain*, vol. i.) The church is a large antique building, which, from the various grotesque carvings, appears to have been built about the same time as the cross; and is constructed with the same sort of stone. It has a square tower, surmounted by a spire, the whole being 193 feet in height. A priory of foreign monks was established in the reign of Henry II at a place called Grovebury, within this parish: and here was also a house of Cistercian monks, which was a cell to Woburn abbey. About half a mile from the town are the remains of a Roman encampment; from which, and other corroborating circumstances, Leighton-Buzzard is supposed to be the Lygeanburg of the Saxon Chronicle, which, with several more towns, was taken from the Britons by Cuthwulph, A.D. 571. Lyfons's *Magna Britannia*, vol. i. 470.

LEIGNE-SUR-USSEAU, a town of France, in the department of the Vienne, and chief place of a canton, in the district of Châtelleraut. The place contains 311, and the canton 5127 inhabitants, on a territory of 142½ kilometres, in 13 communes.

LEILAM, or LEYLAM, a town of the Arabian Irak; 30 miles N. of Bagdad.

LEIMA, a river of Russia, which runs into the Irtisch; 24 miles N. of Tobolsk.

LEINA, or LEINE, a river of Westphalia, which rises in the territory of Eichfeld, passes by Heiligenstadt, Göttingen, Hanover, &c. and joins the Aller about two miles below Zelle.

LEINA, a town of Germany, in the principality of Gotha; 4 miles S.S.W. of Gotha.

LEINE, a river of Germany, which runs into the Neffsa 4 miles N. of Gotha.

LEINEN ZEM, a town of Prussia, in the palatinate of Cullm; 9 miles E. of Thorn.

LEININGEN, or LINANGE, lately a county of Germany, bordering on the bishoprics of Worms and Spire, and almost surrounded by the palatinate. The soil is fertile in corn, fruit, and wine; the forest abounds with game, and it has also mines of copper and iron, and quarries of stone. By the peace of Luneville it was annexed to France.

LEININGEN, a town of France, in the department of Mont Tonnerre, the castle of which was demolished by the French; 11 miles S.W. of Worms. N. lat. 49° 30'. E. long. 8° 4'.

LEINLETTER, a town of Bavaria; 10 miles S.E. of Bamberg.

LEINSTER, the eastern province of Ireland, comprising twelve counties, viz. Louth, Dublin, Wicklow, and Wexford on the sea-coast; Meath, Westmeath, Longford, King's county, Queen's county, Kildare, Carlow, and Kilkenny. This was originally one of the kingdoms into which Ireland was divided at the time of the English invasion, and it was the sovereign of it who facilitated the conquest by soliciting aid from Henry II. and giving his daughter in marriage to earl Strongbow. The English pale was entirely within this province, and it is, on the whole, that which is most populous and best cultivated.

LEIOBATUS, in *Ichthyology*, a name given by Aristotle and Athenæus to a species of the ray-fish, called by many of the old authors *bat marinus*, and by the later authors *leisirraia*, or *raia oxyrynchus*; which see.

LEIOPODES, formed of *λεως*, light, and *πους*, foot, an epithet used by the old medical writers to express such persons who had feet perfectly smooth and even at the bottom, without the usual hollow between the heel and the fore part of the foot.

LEIPHEIM, in *Geography*, a town of Bavaria, in the territory of Ulm, on the S. side of the Danube; 11 miles N.E. of Ulm.

LEIPNIK, a town of Moravia, in the circle of Prerau; 6 miles N.E. of Prerau. N. lat. 49° 28'. E. long. 17° 35'.

LEIPODERMOS, from *λιπος*, to be deficient, and *δερμα*, the skin, one who has lost the prepuce.

LEIPSICK, or LEIPZIG, in *Geography*, a city of Saxony, and capital of a circle of the same name. This is one of the most celebrated towns in Germany, pleasantly situated in a fertile plain, on the river Pleisse. Its circuit is estimated at 89½ paces; and its suburbs are extensive, and consist of good buildings and gardens, being separated from the town by a fine walk of lime trees, which runs round the town, and in the town ditches are planted mulberry trees. Its university, which is famous, was founded in 1409, and contains six colleges, two good Latin schools, and two celebrated societies, viz. a German society, and another for the encouragement of the liberal arts. Leipsick is one of the principal trading towns in Germany, and it is in a peculiar degree the mart of German literature. Besides its foreign commerce, it has three celebrated fairs, at Easter, Michaelmas, and the beginning of the year, at which foreign and domestic wares afford an extensive trade. It has also a distinguishing privilege, consisting in the right of having all staple commodities, imported within the circuit of 60 miles, unladen here, and at least for three days offered for sale to the burghers of the place, and then carried away without being unladen any where else. In the citadel, called Pleiffenburg, situated on the Pleisse, are a mint, founded in

1752; and a chapel for the Roman Catholic worship. The market place, which is spacious, and the council-house, stand in the centre of the town. The exchange is a good building, and the roof of its hall is well painted. The city contains eight parish churches for Lutherans, and also a place of worship for Calvinists. The manufactures are various; consisting of gold, silver, silk, wool, and linen yarn, which are wrought here; and also of stuffs, velvets, stockings, cloths, and linen. Here are also houses for the dyeing of silk, the printing of cotton, and the making of tapestry. Leather, Prussian blue, &c. are prepared here, and the Orphan-house is appropriated to the culture of silk. In Leipzick are supposed to be 20 bookellers, 50 French and Italian merchants and tradesmen, 150 wholesale dealers, 250 retailers, and many dealers in cloth. According to Dithmar, in his Chronicle, this place subsisted, as a town, as long ago as the year 1015. The circle of Leipzick contains 33 towns, and more than 1000 villages. The city is 56 miles W.N.W. of Dresden. N. lat.  $51^{\circ} 13'$ . E. long.  $12^{\circ} 19'$ .

Leipzick, as well as Dresden and the whole of Saxony, keep accounts in six-dollars of 24 good groschen; each grosche being divided into 12 pfenings current. A specie six-dollar is reckoned at 15 six-dollar current, or 32 good groschen. For the coins, see SAXONY. Bills of exchange are paid at Leipzick, since 1786, in Saxon currency, or in August d'ors, Carl d'ors, Fredericks, &c. reckoned at five six-dollars. The time of payment of bills of exchange, presented for acceptance during the four first days of the fair, is during the five first days after the close of the fair is proclaimed; in default of which the bills must be protested before 10 o'clock at night, or the drawer is not liable.

During the fair, when Dresden was in its glory, serious operas were frequently performed at Leipzick by the best musicians, vocal and instrumental; and to the greatest personages in Germany. In 1774, the comic operas of M. Hiller, in the language of the country and without recitative, were the favourite amusements of that flourishing city. Every part of Europe, except Italy, seems unanimous in banishing recitative from their comic operas, indeed every nation has melodies of its own; but there is no recitative, except the Italian, which is fit for dramatic purposes.

LEISZNIG, a town of Saxony, in the circle of Leipzick, on the Mulda, containing two churches, and having manufactures of cloth, lace, stockings, &c. It has a citadel, called Milddenstein; 24 miles E.S.E. of Leipzick. N. lat.  $51^{\circ} 7'$ . E. long.  $12^{\circ} 50'$ .

LEITA, or LEYTHA, a river that rises in the S.W. part of Austria, and joins the Raab at Raab in Hungary; and afterwards, the united stream runs into a branch of the Danube; nine miles W. of Comorn.

LEITH, a sea-port town and burgh of barony, situated on the Frith of Forth, in the county of Midlothian, Scotland. It is about two miles distant from Edinburgh, and may not improperly be called the harbour of that northern metropolis. This town was originally denominated Inverleith; the word *inver*, prefixed to the name of a river, being a frequent appellation in Scotland, and implies a town near the mouth of that river, or its confluence with another. The etymology of this term is very uncertain, some alleging it to be of French, and others of Gaelic derivation.

The period at which Leith was first founded is unknown, but it is undoubtedly a place of great antiquity. It is mentioned by the name of Inverleith in the charter for erecting the abbey of Holyrood, which was built by David I. in the

year 1128. About a century afterwards the harbour of Leith and its mills were granted to the magistrates of Edinburgh by Robert I., and in 1298 they acquired all the other rights and privileges of it, with the exception of the superiority from Logan of Restalrig. Mary of Guise, queen regent of Scotland, constituted this town a burgh of barony in the year 1549. At this time the inhabitants of Leith were divided into four classes, or corporations; the mariners, maltmen, tradesmen, and traffickers, each of which still retains its original charters. In the same reign, the citizens purchased the superiority of their town from the descendants of Logan, but after the death of the queen, Francis and Mary, in violation of the private rights of the people, sold the superiority of the burgh to the magistrates of Edinburgh, to whom it has since been confirmed by several successive charters. Leith suffered considerably when the earl of Hartford invaded Scotland in the year 1541, being on that occasion pillaged and burnt by the English soldiers. After this, however, Leith was rebuilt and fortified anew, but soon after the expulsion of the French in 1560, the council of the kingdom, to prevent the danger arising to the liberties of the country, from the introduction of foreign troops, ordered the fortifications to be demolished. Oliver Cromwell once more raised fortifications for its defence. The citadel, which still remains, was built by that usurper. It then consisted of five bastions, but two of them were entirely demolished at the restoration of the English monarchy, and the site of the whole given to the duke of Lauderdale, then prime minister for Scotland, from whom the magistrates of Edinburgh were compelled to purchase it, at the enormous sum of 6000*l.* sterling. Since the alarm, excited by the appearance of Paul Jones in the Frith of Forth, a battery of nine guns has been erected a little to the westward of the citadel, for the defence of the port and shipping. A party of artillery constantly reside at this battery, which is kept in excellent order; and of late a considerable park of artillery has likewise been stationed here.

Leith is divided into two parishes by the river from which it derives its name. These are distinguished by the appellations of North and South Leith, and communicate with each other by means of two drawbridges, one of which has been very lately erected. The greater part of the town is situated in the parish of South Leith, which also extends over a considerable country district, and includes the ancient parish of Restalrig. North Leith is a much smaller parish, and consists of only about 170 acres. Both on the south and north side of the river, the streets of this town are extremely irregular, and of mean appearance. In the suburbs of South Leith, however, a number of respectable houses have been erected by the more opulent merchants, and may be said to vie, in internal accommodation and exterior appearance, with those of Edinburgh.

Prior to the year 1771, Leith was ill supplied with water, and the streets were neither properly cleaned nor lighted; in that year, however, an act of parliament was obtained to remedy these defects; and the great change which has taken place since that period shews the good effect of the act, and that it had been judiciously prepared and was carefully executed. At Restalrig are still extant some ruins of the old or mother church. This place is about a mile eastward of Edinburgh. The church was founded by king James III., and endowed by the three succeeding monarchs. It was highly ornamented with statuary and sculpture, representing many objects of religious worship. In 1650, the general assembly, in their zeal against Popery, ordered this church, as a monument of idolatry, to be pulled down and entirely demolished. In consequence of this mandate, the inhabitants of South Leith

Leith resorted for divine worship to the chapel of St. Mary, which was afterwards declared by authority of parliament to be the parish church of the district. It is a handsome spacious building; but being found insufficient to contain the inhabitants, a chapel of ease was erected in 1772. Here is also an episcopal chapel; and, as in all towns of any consequence in Scotland, some meetings of Presbyterian dissenters.

The civil government of Leith is vested in a magistrate sent from Edinburgh, having the power and title of admiral of Leith, and in two residing bailiffs, who are elected from the inhabitants of Leith by the town-council of Edinburgh.

The harbour of Leith, which is the chief source of wealth to the place, is formed by the conflux of the water of Leith with the sea. The depth of the water at the mouth of the harbour is at neap tides about nine feet, but in high spring tides about sixteen. It is entirely a tide harbour; the water in the river being too trifling to give any important aid towards the navigation. About the beginning of the last century, the magistrates of Edinburgh improved the harbour at a great expence, by extending a stone pier to a considerable distance into the sea. In the year 1777, they further improved it by erecting an additional stone quay towards its west side. It is accommodated with wet and dry docks, and other conveniences for ship-building, which is carried on to a considerable extent; and vessels come hither to be repaired from various parts of the eastern coast of Scotland. It has been thought advantageous to extend the harbour further into North Leith; and very considerable works are now carrying on for that purpose; which, when completed, will render it a very spacious, as well as a safe and convenient station for trading vessels of almost any burthen. Ships, indeed, can only enter at full tide; but the roads of Leith, which are about a mile from the mouth of the harbour, afford most excellent anchorage at all times.

Leith carries on a very considerable trade; the imports from the southern parts of Europe are wines, brandy, and fruits; from the West Indies and America, rice, sugar, rum, and dye-stuffs; but the principal traffic is with the Baltic, for which it is peculiarly well situated. The shipping of Leith causes a great demand for ropes and sail-cloth; of which articles here are several manufacturing companies. Two glass manufactories are established here, which, in the year 1790, wrought above nine million pounds weight of that article. The manufactures of soap and candles are also carried on to a very great extent; here are also a considerable carpet manufactory, and several iron forges. In 1784, the trade of Leith was estimated at half a million sterling, exclusive of glass-works and ship-building; and there is every reason to believe that, since that period, the amount has been doubled. In the year 1791 the population of North Leith was 2409, and of South Leith 11,432; total 13,841, which was an increase of 4436 since the year 1755. Beauties of Scotland, vol. i. Picture of Edinburgh.

**LEITH Water**, a river of Scotland, which runs into the Forth at Leith.

**LEITHEN**, a river of Scotland, which runs into the Tweed at Inverleithen.

**LEITMERTZ**, a city of Bohemia, in a circle of the same name, seated on the Elbe, well built, and populous; the see of a bishop, suffragan of Prague.

The circle, distinguished by its beauty and fertility, is called the "Bohemian Paradise;" and, independently of its own resources, it has ample supplies, by means of the Elbe, from other countries. It is famous for the wines, produced near Auzitz, and called "Podskalky," and for the

salubrious mineral waters of Topolitz. In this circle, which comprehends 89 feignories, estates, and feats, are tin and precious stones; 28 miles N.N.W. of Prague. N. lat. 50° 31'. E. long. 14° 15'.

**LEI RIM**, a county of Ireland, in the province of Connaught, which is bounded on the north by Donegal and Fermanagh; on the east by Cavan; on the south by Cavan, Longford, and Roscommon, and on the west by Sligo. In form somewhat like an hour-glass, it varies greatly in breadth, being in the widest parts 16, and in the narrowest only six miles across. Its length is 41 Irish, or 52 English miles. It contains 255,950 acres, or about 400 square miles (407,260 acres, or 652 square miles in English measure.) The parishes are 17 in number, partly in the diocese of Kilmore, and partly in that of Ardagh. There are very few unions, and a church in almost every parish. When Dr. Beaufort wrote, the number of houses was rated at 10,026, from which he estimated the population at upwards of 50,000; but Mr. Robertson in 1806, on what authority he has not stated, rates it at 76,630. Of the five baronies into which Leitrim is divided, the two northern are not as populous as the other three. Towards the sea there is an assemblage of wild and lofty mountains, which are divided from one another by deep vallies. These are the mountains of Sliebh-anewr and Dartry, the latter of which towers to an immense height above the level of the sea. Near the interior, the immense Sliebh an-Erin divides the mountainous from the level parts of the country. These great hills are far from unprofitable, for producing abundance of coarse grass, they annually pour forth immense droves of young cattle. The southern baronies are level. Few counties are so plentifully watered as this. The Shannon rises in a plain at the base of Quilca mountain, forming Lough Clean, a small lake, which is considered as the fountain of that noble river; from this it flows to Lough Allen, nearly in the centre of the county, which is 7 miles long and about 30 in circumference; and then, curling in a variety of forms, it glides by Carrick on Shannon, where it leaves the county, taking a southern direction. There are several other lakes and small streams, which are stored with trout, pike, eel, perch, and bream. The natural wants of this county seem abundantly outweighed by its numerous minerals. Iron ore is contained in great quantities in the high grounds. Deep and rich beds of it are also found on the lower grounds; and a vigorous search would undoubtedly discover it in almost every situation. Copper and lead are also met with, but not in such quantities. Coal in deep and rich strata is visible in many places. A variety of clays and plenty of limestone gravel are likewise found. The soil is exceedingly diversified. A rich dark soil on a limestone bottom, a ferruginous loam on the mountains, and an argillaceous stratum, are its chief characteristics. Great quantities of bog and moor tend to interrupt the general fertility of the county. The mode of agriculture adopted by the farmers is injudicious in many particulars. Potatoes, barley, rye, and wheat, are reared in small quantities; oats in abundance for home consumption. A considerable portion of the land is pasture. The farms are small, and generally occupied in common by a number of tenantry. Draining is greatly neglected. Manufactures are rapidly improving, particularly that of linen. There are several bleach-works. Potteries are numerous about Leitrim and Dromahare. The traveller who is anxious for variety, will no where find it in greater perfection than in Leitrim. Extensive tracts of waste may be contrasted with rich lands. The uniform and regular improvements of art are lost in the wild grandeur of picturesque natural disorder. The dale is frequently terminated by the stupendous mountain,

tain, and the beauties of the rich luxuriant woods on the demences, are enriched by the vicinity of beautiful sheets of water. Near a century ago, the county was a continued forest. Immense heaps of charred timber are seen at Dromthambo. A considerable time ago, great exertions were made to plant woods, and it now abounds with almost every variety which the nursery can afford. No town of any size ornaments the county. Carrick on Shannon is the shire town, but does not contain above 100 houses.

"The obstacles," says Mr. Robertson, "which have so long retarded the improvement of Leitrim, have been occasioned by the inhabitants, not by nature; she has made ample store for the exertions of their industry, by bestowing on them valuable minerals. These, however, have not been wrought with sufficient activity, and the public have as yet received little benefit from them. The want of water-carriage has likewise had a great effect; but this promises to be speedily obviated. Pasturage being pursued to a considerable extent, has in a great degree impeded the general improvement. The consequent want of population has retarded the cultivation of the bog and other waste land. But when the true interest of the people shall be sufficiently understood, the minerals will be wrought, pasturage will be supplanted by tillage, the bogs and moors will be covered with luxuriant crops, and in the end Leitrim will become one of the most wealthy counties in Ireland." Beaufort's Memoir; Robertson's Traveller's Guide.

LEITRIM, a small town of Ireland, which gives name to the county, but is not considerable enough to be a post-town. It is three miles N. by E. from Carrick on Shannon, and situated on the river Shannon.

LEITSHACH, a town of the duchy of Stiria; 13 miles N.W. of Marburg.

LEITURGI, *Athens*, among the *Athenians*, persons of considerable estates; who, by their own tribe, or the whole people, were ordered to perform some public duty, or supply the commonwealth with necessaries at their own expences.

LEITZKO, in *Geography*, a town of the Middle Mark of Brandenburg, insituated in the duchy of Magdeburg; 14 miles E.S.E. of Magdeburg.

LEIXLIP, a post-town of the county of Kildare, Ireland. It is beautifully situated on the banks of the river Liffey, and near it is a fine waterfall, called the Salmon Leap. It is eight miles W. from Dublin.

LEKEO, one of the Japan islands, about 120 miles in circumference; 20 miles S. of Ximo. N. lat. 31° 20'. E. long. 152° 40'.

LEKINPOUR, a town of Hindooftan, in the circar of Cattack; 12 miles N.E. of Cattack.

LEKNO, a town of the duchy of Warsaw; 28 miles N.N.W. of Gnesna.

LEKSAND, a town of Sweden, in Dalecarlia; 20 miles N.W. of Falun.

LELAND, JOHN, in *Biography*, was born in London about the end of Henry VIIIth's reign, and was educated at St. Paul's school, under William Lily, from whence he was sent to Christ's college, Cambridge. He removed from this university to All-souls, Oxford; and for farther improvement, especially in the Greek language, he went to Paris, cultivated an acquaintance with the principal scholars of the age, and acquired a knowledge of several modern languages. Upon his return he took orders, and was appointed one of Henry VIIIth's chaplains. The king conferred upon him the office of keeper of his library, and gave him the title of royal antiquary, which no other person in this kingdom before or after possessed. To the title was annexed a commis-

sion, empowering him to search after all objects of antiquity in the libraries of all cathedrals, abbies, priories, colleges, &c. He spent much time in travelling through England, and in visiting all the remains of ancient buildings and monuments of every kind, with the view of collecting every thing that could illustrate the history and antiquities of this nation. At the dissolution of the monasteries he made application to secretary Cromwell to get the MSS. which they contained conveyed to the king's library. He obtained considerable preferment in the church, the duties of which did not require much active service; he accordingly retired with his collections to his house in London, for the purpose of digesting them and preparing the publications he had promised the world; but either intemperate application, or some other cause, brought upon him a derangement of mind in the year 1550, from which he never recovered. He died in 1552. During his life, he published several Latin poems, and some tracts on antiquarian subjects. His MS. collections, after passing through many hands, came into the Bodleian library, furnishing very valuable materials to Camden, Dugdale, Burton, and others. After his decease in 1589, a volume of his small Latin poems was published by Mr. Thomas Newton of Cheshire, under the title of "Principum et illustrium aliquot et eruditorum in Anglia virorum Encomiz." From his collections, Anthony Hall published, in 1709, "Commentarii de Scriptoribus Britannicis." "The Itinerary of John Leland, the Antiquary," was published by Hearne at Oxford, in nine vols. 8vo. The same editor published "Joannis Lelandi Antiquarii de rebus Britannicis Collectanea," six vols. Biog. Brit.

LELAND, JOHN, a dissenting minister, was born at Wigan, in Lancashire, in the year 1691. While he was very young his father removed with his family to Dublin, where the son was seized with the small-pox of so malignant a nature, that it entirely deprived him of his understanding and memory. In this melancholy condition he remained twelve months, but after his recovery, he recommended himself to much notice by the quickness of his parts, and by the proficiency which he made in his learning. He was therefore educated for the Christian ministry among the Dissenters; and was, in due time, invited to become joint-pastor with the Rev. Mr. Weld, to which office he was ordained in 1716. He first appeared as an author in 1733, by publishing "An Answer to a late Book, entitled 'Christianity as old as the Creation &c.' in two volumes." In 1737, he embarked in a controversy with Dr. Morgan, by publishing "The divine Authority of the Old and New Testament asserted against the unjust Apeironists and false Reasonings of a Book, entitled The Moral Philosopher." The learning and abilities displayed by Mr. Leland in these publications, and the service which he rendered by them to the Christian cause, procured him many marks of respect and esteem from persons of the highest rank in the established church, as well as from the most eminent of his dissenting brethren; and from the university of Aberdeen he received, in the most honourable manner, the degree of doctor of divinity. In the year 1742, Dr. Leland published an answer to a pamphlet, entitled "Christianity not founded on Argument;" and in 1753, he distinguished himself still further as an advocate in behalf of Christianity, by publishing "Reflections on the late Lord Bolingbroke's Letters on the Study and Use of History; especially so far as they relate to Christianity and the Holy Scriptures." Dr. Leland was now justly considered a master in this branch of controversy, and at the desire of some valuable friends he sent to the press, in 1754, "A View of the principal deistical Writers that have appeared in England, in the last and present Century, with Ob-

versations, &c." The design of this work was to give some idea of the productions of the deistical writers, and of the several schemes which they have advanced, as far as the cause of revealed religion is concerned. In this work, the author ably maintained the reputation which he had acquired by his former productions, and it met with a very favourable reception. He afterwards published a supplement relating to the works of Mr. Hume and Lord Bolingbroke, and this was followed by a third volume, comprehending the author's additions and illustrations, with a new edition of his "Reflections upon Lord Bolingbroke's Letters, &c." The whole of this work is now comprised in three volumes; it secured the author general public approbation, and encouraged him to continue his exertions to a very advanced age. Accordingly, when he was upwards of seventy years old he published, in two volumes 4to. "The Advantage and Necessity of the Christian Revelation, shewn from the State of Religion in the ancient heathen World, especially with respect to the Knowledge and Worship of the one true God; a Rule of moral Duty, and a State of future Rewards and Punishments, &c." This work was afterwards reprinted in two volumes, 8vo. Dr. Leland died in his seventy-fifth year, on the 16th of January 1766; he was distinguished by considerable abilities, and very extensive learning; he had a memory so tenacious, that he was often called the "walking library." After his death a collection of his sermons was published in four volumes octavo, with a preface containing some account of the life, character, and writings of the author, to which our readers are referred for farther information respecting him.

**LELAND, Dr. THOMAS**, a divine of the church of England, was born at Dublin about the year 1702. Having received the elements of a good education, he was admitted a student, and afterwards became fellow of Trinity College, Dublin. He was author of "A History of Ireland," 4to.; "The Life of Philip of Macedon;" and "The Principles of human Eloquence." He also translated the orations of Demosthenes, in two volumes, 8vo., which came out separately, and were well received by the public. Dr. Leland died in 1785, at the age of eighty-three.

**LELCZA**, in *Geography*, a town of Russian Poland, in the palatinate of Volhynia; 60 miles N. of Zytomiers.

**LELEGES**, in *Ancient Geography*, a collection of people from different nations, as the supposed etymology of their name, derived from *λεγο*, *I assemble*, imports. They anciently occupied the territory adjoining to that of the people called by Homer Cilices or Cilicians; and when Achilles ravaged their country, which lay north-west of the gulf of Adramyttium, they passed over into Caria, and took possession of the environs of Halicarnassus. Their town was the metropolis of Caria, near Myfia. They were a kind of robbers and vagabonds, who resembled the Cilicians in their disposition and manners. The first king of Laconia, according to Pausanias, was Lelex; and the country took the name of Lelegia from these people.

**LELIAN**, in *Geography*, a town on the north coast of the island of Bourou.

**LELIT PATTAN**. See **PATTAN**.

**LELOW**, a town of Austrian Poland, in the palatinate of Cracow; 32 miles N.W. of Cracow.

**LELUNDA**, a river of Africa, which joins the Zaire, about 60 miles from its mouth.—Also, a town of Africa, in the kingdom of Congo, on the fore-mentioned river; 35 miles E. of St. Salvador.

**LELY, Sir PETER**, in *Biography*, the most excellent portrait-painter this country possessed, after the death of

Vandyke. Many of his works continue to be held in molt deserved estimation, and to be ranked amongst the classics of the art. He was born at Soest, in Westphalia, in 1617. His family name was Vander Vaas; but from the circumstance of his father, who was a captain of foot, being born in a perfumer's shop, whose sign was a lily, and receiving the appellation of captain Du Lys, or Lely, our artist obtained it as a proper name.

He was first instructed in the art by Peter Grebber at Haerlem; and having acquired a knowledge of its principles, and a very considerable degree of skill in execution, he came to England in 1641, and commenced portrait-painter. After the kingdom had sustained the irreparable loss of Vandyke, and the restoration was completed, he was appointed state-painter to Charles II., and continued to hold that office with great reputation till his death, which happened in 1680. He was seized by an apoplexy, while painting a portrait of the duchess of Somerset, and died instantly, at the age of sixty-three.

Though Lely's talents, as an artist, do not entitle him to hold a rank equal to that filled by his great predecessor; yet they justly claim very great respect and admiration. He fell short of Vandyke in two very essential parts of portraiture, *viz.* taste and expression. Of the former it must be acknowledged that he sometimes caught a glimpse; and, in the disposal of a piece of loose drapery, exhibited it with an enchanting style: but that high class of taste, which evidently sways the artist's mind who arranges, without apparent study, all the parts of a composition in an agreeable and effective manner, he does not appear ever to have felt or understood. It is in parts only that he wrought with taste: in the ringlets of the hair, for instance; seldom in the actions of his figures, and scarcely ever in the tout-ensemble of his pictures. As to the expression of his portraits, it is almost entirely deserted, at least in those of his females, by what the poet has said, that he

" ——— on animated canvas stole

The sleepy eye that spoke the melting soul."

The consequence is, that individual expression, the very essence of portrait-painting, is lost sight of; and a certain air of general resemblance is seen in them all.

Yet in spite of these great deficiencies, Lely's pictures, by the mastery of his execution, and his skill of imitation, where he pleased to employ it, will ever command admiration. He possessed the art of flattery more than most artists; and no doubt by that secured the approbation of his contemporaries, and consequently great practice. He painted drapery in a style peculiarly his own, with great richness and fulness of effect; and he understood fully the union of folds, though he did not always dispose them in just or agreeable shapes. His pencil is broad and full, and the markings of forms and features are free and decided in his pictures, which are to be found in almost every noble mansion in the kingdom; so great were the encouragement and employment he enjoyed.

By it he acquired a very considerable fortune, of which he employed a large portion to furnish himself with a collection of pictures and drawings. These, at his death, were sold by auction, and were so numerous, that forty days were consumed in the sale; and the product amounted to 26,000*l.*; besides which, he left an estate he had purchased, of 600*l.* per annum.

**LEMA**, in *Geography*, a small island in the Chinese sea. N. lat. 22°. E. long. 114° 17'.

**LEMA Islands**, a cluster of small islands in the East Indian sea,

fea, near the west coast of the island of Borneo. S. lat. 1° 10'. E. long. 108° 48'.

LEMAIRE, in *Biography*, is now generally supposed to have added, about the middle of the seventeenth century, the syllable *fi* to the hexachord, in order to furnish a name, in solmisation, to the sharp 7th of the key, and ease the students in singing of the embarrassments of the mutations. Many volumes have been written for and against the mutations. We believe that in the conservatorios at Naples and Venice they are still preserved, and by the organists of our cathedrals who teach the choristers; but in many other parts of Europe, besides France, the *fi* has been adopted. Though much has already been said on both sides the question, much still remains to be said by the champions of both methods. See MUTATION, SOLMISATION, HEXACHORD, and the syllable *Si*, in their several places.

LEMAN LAKE, in *Geography*. See GENEVA and LAKE.

LEMAN, *Department of*, one of the eleven departments of the eastern region of France, composed of Gex and Geneva, and the north part of Savoy, in N. lat. 46° 10', on the frontier of Switzerland, and so called from lake Lemman. It is bounded on the north by the lake, Switzerland, and the department of Jura; on the east by the Valais, and the departments of the Doria and Mont Blanc; on the south by the department of Mont Blanc; and on the west by the departments of the Ain and Mont Blanc. Its chief towns are Geneva, Thonon, and Bonneville. It contains 197 square leagues, and 215,884 inhabitants; and is divided into three circles or districts, including 23 cantons, and 276 communes; viz. Geneva, comprehending 103,550 inhabitants; Thonon, the inhabitants of which are 39,465; and Bonneville, including 72,869 inhabitants. Its contributions amount to 906,632 francs, and its expences to 200,427 francs, 66 cents. This department consists of hills, vallies, and plains; producing grain, wine, fruits, and pastures. It has forests and iron-mines.

LEMAVI, in *Ancient Geography*, a people of Spain, in the Tarragonensis. Their capital was Dactonium, according to Ptolemy.

LEMBA, a town of Asia, which Josephus classes in the number of those which the Jews possessed in the country of the Moabites.

LEMBA, in *Geography*, a town of Africa, in the kingdom of Congo.—Also, a town on the west coast of the island of Celebes. S. lat. 3° 15'. E. long. 119° 52'.

LEMBACH, a town of Austria; 9 miles S. of Aigen.

LEMBEECK, a town of France, in the department of the Scheldt; 8 miles S. of Ghent.

LEMBIGE, or LEMBAYE, a town of France, in the department of the Lower Pyrenées, and chief place of a canton, in the district of Pau; 15 miles N.E. of Pau. The place contains 960, and the canton 11,626 inhabitants, on a territory of 217½ kilometres, in 47 communes.

LEMBERG, or LEOPOLD, a city of Austrian Poland, and capital of Galicia, large and opulent, and well fortified with timber. It lies low on the banks of the river Peltew, which soon after joins the Berg; being surrounded with hills and mountains which command the town. It is the see of a Popish archbishop, and also of a Russian and Armenian bishop. It has two castles, one within and another without its walls; the latter standing on a high hill, and having the Carmelite monastery, which is fortified, for a citadel: and it carries on a considerable trade. Lemberg has a magnificent cathedral, several other churches, a gymnasium or seminary, an arsenal, a public granary, two Jewish schools,

&c. A provincial diet and court of judicature are held in this town. It is inhabited by a mixed people of different nations; but no Protestants are tolerated; 72 miles S.S.E. of Chelm. N. lat. 49° 51'. E. long. 23° 59'.

LEMBO, a town of Africa, in Congo, on the Zaire; 40 miles S.W. of Etrona.

LEMERY, NICHOLAS, in *Biography*, an eminent French chemist, was born at Rouen, in November 1645. His father, Julian Lemery, was a *procureur* in the parliament of Normandy, and of the Calvinist persuasion. Nicholas was brought up to the business of pharmacy, under an apothecary of Rouen; and he went to Paris in 1666, with the view of obtaining farther improvement, especially in the art of chemistry, which he perceived to be the basis of correctness in the processes of pharmacy. Here he studied under Glaser, demonstrator of chemistry in the royal garden; and afterwards spent six years in travelling, for the purpose of adding to his knowledge. He resided a considerable time at Montpellier, then famous for its apothecaries; and brought with him to Paris, where he settled in that capacity in 1672, all the knowledge in his department of the art which the kingdom at that time afforded. In order to give public proofs of his information and skill, he announced a course of lectures on chemistry, which his friend, M. Martin, apothecary to the prince of Condé, allowed him to deliver in his laboratory, at the hotel of that prince. He afterwards procured a laboratory of his own, which, though little better than a dark cellar, soon became the centre of attraction, not only to the first scientific characters in Paris, but to ladies, who resorted thither partly from a love of knowledge, and partly from fashion. Chemistry was then indeed coming into great vogue in that metropolis; and Lemery contributed greatly to its advancement, by treating it in a simple and perspicuous manner, divesting it of the jargon of mysticism in which it had been hitherto obscured, and, by the dexterity of his experiments, exhibiting the facts which it discloses to the comprehension of every understanding. By these means, Lemery established such a character for superior chemical skill, as enabled him to make a fortune by the sale of his preparations, which were in great request both in Paris and the provinces. One article in particular was the source of great profit, namely, the oxyd, or, as it was then called, the magistry of bismuth, and known as a cosmetic by the name of *Spanish white*, which no other person in Paris knew how to prepare. In 1675 he published his "Cours de Chymie," which was received with general approbation and applause, and passed through numerous editions: indeed feldom has a work on a subject of science been so popular. It sold, says Fontenelle, like a novel or a satire: new editions followed year after year; and it was translated into Latin, and into various modern languages. Its chief value consisted in the clearness and accuracy with which the processes and operations were detailed: the science was not yet sufficiently advanced for a rational theory of them. Indeed he seems to have worked rather with the view of directing apothecaries how to multiply their preparations, than as a philosophical chemist; and his materials are not arranged in the most favourable manner for the instruction of beginners in the science. Nor did he divulge the whole of his pharmaceutical knowledge in this treatise: he kept the preparation of several of his chemical remedies secret, in order to obtain the greater profit by their sale.

Hitherto our chemist, though openly professing Calvinistic principles, had not been interrupted by the spirit of persecution, which disgraced the latter part of the reign of Louis XV.; but in 1681, he received an order to discon-  
tinue

time his public lectures within a limited time. While under this interdiction, he was invited to Berlin by the elector of Brandenburg; but he preferred removing to England, where he was favourably received by Charles II., who had an attachment to chemical pursuits. Circumstances, however, did not accord with his expectations; and he returned to his own country, and took the degree of doctor of physic at Caen, with the hope of thus protecting himself from further persecution. He actually acquired considerable employment in his new character at Paris; but the revocation of the edict of Nantes, in 1685, by which the practice of physic was interdicted to Protestants, deprived him of his means of subsistence, and reduced him to such difficulties, that his constancy at length gave way, and, in the following year, he with his family was reconciled to the Catholic church. He then readily obtained letters patent, allowing him to resume his practice, and his office of public teacher; and he again derived considerable emolument from the sale of his medicines. In 1697 and 1698 he published two works of considerable value, but not without imperfections. These were, 1. "Pharmacopée universelle," containing a collection of the formulæ given in all the reputable dispensatories in Europe, with corrections and improvements. Like the pharmaceutical works of that time, it was overloaded with articles, but was superior to its contemporaries. 2. His "Dictionnaire universel des Drogues Simples;" which was a still more useful work than the former.

On the re-establishment of the Academy of Sciences in 1699, Lemery was appointed associate-chemist, and succeeded to the office of pensionary, on the death of Bourdin. He then read before that body the papers on the subject of antimony, which were printed in 1707, under the title of "Traité de l'Antimoine." Upon this subject he had a controversy with an anonymous critic, in which he was considered as not very successful. He was now advancing in years, and found the infirmities of age increasing upon him, when his life was suddenly terminated by a fit of apoplexy, on the 16th of June 1715. Lemery was one of the ablest chemists of his time, and indefatigable in his researches; having spent his life in his laboratory, or study, at the bed-side of the sick, or in the Academy. He was a man of great simplicity of manners, sincere in his friendships, and of the strictest integrity in the commerce of life. Eloy Dict. Hist. de la Med. Gen. Biog.

LEMERY, LOUIS, son of the preceding, was born at Paris in January 1677, and obtained a reputation for knowledge in chemistry and medicine worthy of his name. He was intended for the profession of the law; but he had imbibed from the pursuits of his father so great a taste for those sciences, that he entered the faculty of medicine of his native city, and received the degree of doctor in 1698. Two years afterwards he was admitted into the Academy of Sciences, and in 1708 he delivered lectures on chemistry in the royal garden. In 1710 he was appointed physician to the Hotel-Dieu, a post which he occupied during the remainder of his life. In 1712 he obtained the rank of associate in the Academy, and succeeded his father in that of pensionary in 1715. He purchased the office of king's physician in 1722; and in that capacity he accompanied the infants of Spain on her return from France, whither he had gone with the view of being married to Louis XV. Soon after his return to Paris, he was honoured by the queen of Spain with the title of her consulting physician. In 1731 he was appointed professor of chemistry in the royal garden, in the place of Geoffroy. At a subsequent period, he became particularly attached to the establishment of the dukes of Brunswick, whom he frequently visited in the palace of

Luxembourg; and he likewise obtained the patronage of the princefs of Conti, in whose hotel he regularly passed a part of every day, and there composed several of the chemical papers which he read before the Academy of Sciences. These papers treat of the subjects of iron, of nitre, and some other salts, of vegetable and animal analyses, of the origin and formation of monsters, &c. Louis Lemery died on the 9th of June 1743, and the loss of him was much regretted; for to the mild and polished manners of the gentleman, he united great sincerity and constancy in his attachments, and sentiments of liberality and generosity in all his proceedings.

In addition to the papers published in the Memoirs of the Academy, he left the following works: 1. "Traité des Alimens," Paris, 1702, which was frequently reprinted, and greatly augmented by Brühler in the edition of 1755, 2 vols. 12mo. 2. "Dissertation sur le Nourriture des Os," Paris, 1704, 12mo. In this work he maintains that the bones are nourished by a peculiar gelatinous fluid, deposited in their substance by the small arteries, and not by the marrow, as had been supposed by some. He likewise published three letters, on the generation of worms in the human body, in opposition to the treatise of Andry, with whom a sharp controversy was carried on upon this topic. Eloy Dict. Hist. Gen. Biog.

LEMEYBAMBA, in *Geography*, a town of Peru, in the diocese of Truxillo; 22 miles S.W. of Chacapoya.

LEMGO, or Lemgow, a town of Westphalia, in the county of Lippe, on a small river, near the Werra, divided into the Old and New Town, each of which has its own magistrates; formerly one of the Hanse towns; 17 miles S.S.W. of Minden. N. lat. 52° 2'. E. long. 8° 44'.

LEMIA, a small island in the Pacific ocean, near the coast of Chili. S. lat. 44° 6'.

LEMINGTON, a post-town of America, in York county, Maine; 610 miles N.E. from Washington.—Also, a township in Essex county, Vermont, on the W. bank of Connecticut river, and near the N.E. corner of the state. It contains 52 inhabitants.

LEMLANT, a small island in the Baltic, near the S.E. of Aland; about 20 miles in circumference. N. lat. 65° 4'. E. long. 19° 58'.

LEMLEM, a country of Africa, in the interior part of Negroland; 500 miles E.S.E. from Tombucou.

LEMLUM, a town of the Arabian Irak; 33 miles S.E. of Hellah. N. lat. 31° 43'.

LEMMA, in *Botany*, a name borrowed from the ancient Greek writers, whose *λεμμα* is supposed to have been so called from *λεμα*, a scale, bark, or membrane, and to have been either our Duckweeds, see LEMSA; or some other aquatic production, whether of the vegetable or the corolline kind, that adhered to shells. Juss. 16.—This name was given by Bernard de Jussieu to the proper *Marsilea* of Linnaeus, for which it seems difficult to give a good reason. We may indeed assent to the separation of Michx's *Salvinia* from that genus (see Jussieu); but this does not oblige us to abrogate a name long destined to commemorate a meritorious naturalist. See MARSILEA.

LEMMA, *λημμα*, of *λεμμα*, I assume, in *Mathematics*, denotes a previous proposition, laid down in order to clear the way for some following demonstration; and prefixed either to theorems, in order to render the demonstration of them less perplexed and intricate; or to problems, to make the resolutions of them more easy and short. Thus, to prove a pyramid one-third of a prism, or paralleloiped, of the same base and height with it, the demonstration of which, in the ordinary way, is difficult and troublesome, this lemma may

be premised, which is proved by the rules of progression, that the sum of the series of the squares, in numbers in arithmetical progression, beginning from 0, and going on, 1, 4, 9, 16, 25, 36, &c. is always subtriple of the sum of as many terms, each equal to the greatest; or is always one-third of the greatest term multiplied by the number of terms. Thus, to find the inflection of a curve line, this lemma is first premised, that a tangent may be drawn to the given curve, in a given point.

So, in physics, to the demonstration of most propositions, such lemmata as these are necessary first to be allowed: that there is no penetration of dimensions; that all matter is divisible; and the like. As also in the theory of medicine, that where the blood circulates, there is life, &c.

LEMMA, in the *Ancient Music*, a rest or pause of a *short* syllable in the catalectic rhythm. See RHYTHM.

LEMMA, λεμμας, in *Pharmacy*, a term used to express the hulk or shell of certain fruits, as the almond and the like; and, in general, whatever is taken off in decortication: thus, the hulks of oats, barley, &c. are the lemmata of those feeds.

LEMMER, TITE, in *Geography*, a sea-port of Friesland, near the Zuyder sea; 20 miles S. of Lewarden. N. lat. 52° 52'. E. long. 5° 30'.

LEMMER, or Lemming, in *Zoology*. See Sable Mouse.

LEMNA, in *Botany*, λεμμα or λεμμα of the Greeks; see LEMMA. Duckweed or Duck's meat. Linn. Gen. 478. Schreb. 620. Willd. Sp. Pl. v. 4. 193. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 956. Wiggerf. 66. Ehrh. Beitr. fasc. 1. 43. Brown Prodr. Nov. Holl. v. 1. 345. Lamarck Illustr. t. 747. (Lenticula; Juss. 19. Mich. Gen. 15. t. 11. Dill. Gen. 118. t. 6.)—Clafs and order, *Diandria Monogynia*. Nat. Ord. *Miscellanea*, Linn. *Naiades*, Juss. *Hydrocharitaceae*, Brown.

Gen. Ch. Cal. Perianth inferior, of one leaf, roundish, obtuse, obscurely two-lobed, soon disappearing. Cor. none. Stam. Filaments two, awl-shaped, spreading, more or less unequal, longer than the calyx; anthers terminal, of two round lobes. Pist. Germen superior, ovate; style columnar, shorter than the stamens; stigma simple, or slightly notched. Peric. Capsule roundish, of one cell, not bursting. Seeds few, oblong, striated, pointed at each end, vertical, ranged in a simple circular row.

Eff. Ch. Calyx of one leaf, inferior. Corolla none. Capsule of one cell, without valves. Seeds few, oblong.

Obs. The first person who ever observed the fructification of a *Lemma* appears to have been Valineri, whose essay on the subject, describing the flowers of *L. minor*, is published in the *Ephemerides Natura Curiosorum*, and in the Italian solo edition of his works, v. 2. St. t. 14, 15. His figure of the flower is borrowed by Dillenius, in the appendix to his *Plante Giffenses*, cited above. Micheli, several years after, published excellent representations of the flowers and fruit, observed in two or three species, to which he applied the generic name *Lenticula*; calling by that of *Lenticularia* such as he could not meet with in a flowering state. This is a distinction without a difference, and of the latter *L. trifolca* has since been found in perfection by Mr. Dawson Turner of Yarmouth, in June, 1801. Willdenow says it has been found by Wolf. Ehrhart, in his German *Beitrag*, fasc. 1. 43, has given an entertaining account of his examination of *L. gibba* in flower at Hanover, July 13, 1779. This was found near Lewes in Sussex, by Mr. W. Borrer in June 1803, as was *minor* by the same gentleman in 1802, so that three species being now distinctly figured in fructification, in Engl. Bot. t. 926, 1095 and 1233, we are no longer in the dark on the subject, and we venture to remove

the genus from *Monoclea* to *Diandria*, as suggested in Fl. Brit. 958. and Prodr. Fl. Grac. v. 1. 11. One British species still remains, the *polyrrhiza*, whose flowers appear to have been seen by one person only, Grauer, a young friend of Wiggerf., at Kiel, about 1780.

The calyx seems to be variable in this genus, and is probably soon evanescent. Some flowers also occasionally want the complete germen, but this is accidental, and they appear to be, in no species, truly monocleous, nor regularly polygamous.

1. *L. trifolca*. Ivy-leaved Duck-weed. Linn. Sp. Pl. 1376. Engl. Bot. t. 926. (Hederula aquatica; Lob. Ic. v. 2. 36. Ger. em. 830.)—Leaves stalked, lanceolate, proliferous.—Found throughout Europe, floating in clear still pools and ditches. Mr. R. Brown has observed it in New Holland. It is a pale-green, smooth, pellucid, annual herb, floating in fresh water, near or upon the surface, and consists of several lanceolate, ribbed, entire, sometimes waved or toothed, leaves, each, with its stalk, about an inch long. Each leaf throws out from its centre underneath a solitary simple root, descending, to more than the length of an inch, into the water, and tipped with a membranous sheath. From the same point whence the root originates, spring a pair of young divaricated flat leaves, looking like lobes of the old one. The flowers proceed solitarily from a marginal chink, at one or both sides of a leaf, and are scarcely perceptible but by their prominent yellowish anthers. Wolf, the author of a dissertation on *Lemma*, published at Altorf in 1801, and quoted by Willdenow, appears to have been the first who ever found the flowers of this species.

2. *L. minor*. Lesser Duck-weed. Linn. Sp. Pl. 1376. Engl. Bot. t. 1095. Michaux Boreali-Amer. v. 2. 163. (Lens palustris; Camer. Epit. 852. Ger. em. 829.)—Leaves sessile, nearly flat on both sides. Roots solitary.—Common and abundant in summer time, on the surface of stagnant pools throughout Europe. Michaux has also observed it in Carolina, and Brown in New Holland. This being the common species in Greece, Dr. Sibthorp justly presumed it to be the *φλωκος*, or *επι των τεταρτων* of Dioscorides; not that we would suppose this ancient sage accurate or attentive enough to have distinguished it from the two or three following, which may possibly grow likewise in the country he investigated. The leaves are obovate or elliptical, entire, slightly convex beneath, in consequence of the formation of air within, by which they become buoyant, and float in dense masses over the whole surface of the water, being much smaller and more crowded than in the former. They are, like that, in some measure proliferous. The roots are solitary from the centre of each beneath, and are temporary, not perennial, nor forming offsets. Flowers from marginal chinks, always, as far as we have seen, furnished with both itameus and pistil, and their calyx is more ample, as well as more evidently two-lobed, than in the above. The seeds when ripe doublets descend, and take root in the mud, as Valineri observed the young plants ascend in the form of a green soft pulp, full of air-bubbles, from the bottom to the surface, early in the spring, and soon after the waters were mantled with an entirely green covering of the perfect leaves, lying over each other.

Micheli's *Lenticularia media*, t. 11. f. 2, and *minor*, f. 3, both perhaps belong to this species.

3. *L. gibba*. Gibbous Duck-weed. Linn. Sp. Pl. 1377. Engl. Bot. t. 1233. (Lenticula palustris major. &c.; Mich. Gen. 15. t. 11. f. 1, not 2.)—Leaves sessile; slightly convex above; hemispherical beneath: Roots solitary—Less frequent by far than the last, in still pools of various parts of Europe. Hudson considered this as a variety only, but it differs

differs in being larger than *minor*, remarkably timid, succulent, and vascular. Its upper surface is convex, usually of a fine green, but often purplish; the lower almost hemispherical, and paler. *Roots* generally solitary, sometimes in pairs. Micheli says the *calyx* soon disappears; and Mr. Borrer's specimens were too far advanced to shew it, though the *stamens* and *style* were in perfection.

4. *L. polyrrhiza*. Greater Duck-weed. Linn. Sp. Pl. 1377. (Lenticularia major polyrrhiza, infernè atro-purpurea; Mich. Gen. 16. t. 11. f. 1.)—Leaves sessile, obovate, convex beneath. *Roots* clustered.—Native of ditches and pools in Europe; and Willdenow says of North America also. It is annual, flowering in July and August, but though the *leaves* are twice or thrice the size of the two last, the *flowers* have not been detected, except by the Danish naturalist Grauer above-mentioned, who accounts for this by his description of their situation. He says they are to be found at each side where one leaf is joined with the other, under the folding of its edge, and that the fruit agrees with that of *gibba*, except in being larger, and more flattened. The *leaves* are rounder and blunter; convex, and usually dark purple, underneath. The *roots* spring numerously in clusters from the centre of each.

5. *L. obcordata*. Heart-shaped Duck-weed. Vahl. Symb. v. 2. 95. Willd. n. 5.—“Leaves sessile, inversely heart-shaped. *Roots* clustered.”—Native of waters in the East Indies. Vahl, from whom alone we have any knowledge of this, says “the *leaves* are scarcely so long as the nail, of a bright green at the fore part of their upper side; purplish in the hinder part and underneath, as well as the *roots*. A longitudinal furrow runs along the leaf, sending off a branch to each lobe, which divides each nearly in two, to the extremity.” It does not appear why Willdenow defines the leaves as “proliferous at the apex.”

6. *L. arrhiza*. Rootless Duck-weed. Linn. Mant. 294. (Lenticularia omnium minima, arrhiza; Mich. Gen. 16. t. 11. f. 4.)—Leaves in pairs, without roots.—Observed by Micheli in fish-ponds near Florence. Duchesne found it in France; and we have specimens, both dried and in spirits, collected at Fontainebleau by the late Mr. Stephen de Lessert. This minute species is not bigger than an ordinary pin's head, and each plant consists of one larger *leaf* and one smaller, joined by their extremities; the former being elliptical, flatish on the upper side, very turgid below; the other nearly globose. No roots are discoverable, nor is any thing known of the fructification.

Micheli's *Lenticula media*, t. 11. f. 2, and *minima*, f. 3, remain undetermined by following writers. We venture to characterize them as follows.

7. *L. disperma*. Two-seeded Duck-weed. (Lenticula palustris media, pallide virens, infernè minus convexa, radicibus longissimis fructu dispermo; Mich. Gen. 15. t. 11. f. 2.)—Leaves sessile, obovate, convex beneath. *Roots* solitary, very long. Capsule with two seeds.—Found by Micheli in a place called the *Beccavivette* near Florence. He delineates the *leaves* about half the size of *L. gibba*, as well as much less convex beneath, and the *seeds* as but two in each capsule, whereas in *gibba* they are four, five, or six.

8. *L. atro-virens*. Dark-green Duck-weed. (Lenticula palustris minima atro-virens, utrinque pene convexa; Mich. Gen. 15. t. 11. f. 3.)—Leaves sessile, elliptic-oblong, convex on both sides. *Roots* solitary.—Found by the same author near Florence. This appears to be smaller than *L. minor*, with more oblong and darker *leaves*, whose upper side is as convex as the under one.

LEMNIAN EARTH, *Lemnia terra*, comprehends several

varieties of clay, mostly red and ferruginous, formerly preserved under this name, and employed in medicine. These were distinguished into the white, the yellow, and the red. They were brought from the Levant, mostly in the shape of small cakes, bearing the impression of a seal, whence the name of *Terra Sigillata*. Several of them are to be referred to *Bolz*; which see. The whitish kind, which appears to be the true Lemnian earth, and so highly valued by the ancients, on account of the alexipharmic virtues which they ascribed to it, is described under the article FULLER'S Earth.

The red earth is dug in a hill in the island of Lemnos, and in no other place, so far as is yet known; and the fine and true earth only in one pit, which used to be opened once every year, and no oftener, with great solemnity; and the earth, supposed sufficient for the year's demand, was taken out and sold to the merchants; some sealed with various figures, other quantities unsealed; but what was there bought unsealed, was generally formed into small masses, and sealed before it was offered to sale in Europe, the druggills always expecting to find Lemnian earth sealed.

This earth, to which imaginary virtues were attributed, was too often adulterated, frequently by the Turks upon the spot, either by mixing it with other earths, or another earth alone being sold in its place; but more frequently in Europe, where every wholesale dealer knew how to make a composition of our own clays, and properly tinge them with ochre, and afterwards give an impression resembling that of the genuine.

This earth was celebrated by the ancients as a sovereign remedy against poisons and the bites of reptiles: the Turks and Greeks still retain that notion, for the cups out of which the grand seignior drinks are made of this red earth, so that it is reserved chiefly for the sultan's use. But the alexipharmic and astringent property of this and the other boles is now in little or no esteem. (See BOLE.) It is also dug in the island of Lemnos, and was used in the German shops as an astringent and fudorific, and said to be of great efficacy in dysenteries, hemorrhages, and malignant fevers. The ancients knew this kind, but never used it in medicine, esteeming the other superior, but they employed it as the cimolia in cleaning linen and woollen cloths.

The yellow Lemnian earth is counterfeited two ways; the one by a yellow ochre, which may be discovered by its staining the hands, and the other by a yellow clay; but this is easily known by its want of the true florid colour, and having all the characters of a clay, not a bole. The genuine is found only in the island of Lemnos, and is the tiratum next above the red. It was formerly esteemed a fudorific, astringent, and vulnerary. Da Costa's Hist. of Fossils, p. 1. 14. and 22.

LEMNIS, in *Ancient Geography*, an island of Africa, in Mauritania Cæsariensis, E.N.E. of the mouth of the river Malva.

LEMNISCATE, in the *Higher Geometry*, is the name of a curve which has the form of the figure of 8. If we call  $A P, x$ , (Plate XI. *Analysis*, fig. 1.), and  $P M, y$ , and the constant line  $BC, a$ , the equation of the curve will be  $a y = x \sqrt{a a - x x}$ , or  $a^2 y^2 = a^2 x^2 - x^4$ , which is an equation of the fourth degree; it is also evident that a right line which passes through the double point  $A$  will cut this curve in four points, the double point being reckoned equal to two. See CURVE.

LEMNISCIA, in *Botany*, so called by Schreber, from  $\lambda\eta\mu\iota\sigma\kappa\alpha\iota$ ; a bandage, or fillet, in allusion to the shape of its petals. Schreb. 358. Willd. Sp. Pl. v. 2. 1172. Mart. Mill.

Mill. Dict. v. 3. (Vantanea; Aubl. Guian. v. t. 572. t. 220. Juss. 434. Lamarck. Illustr. t. 471.)—Clas and order, *Polyandria Monogynia*. Nat. Ord. uncertain.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, five-toothed, acute, short. *Cor.* Petals five, linear, long, acute, recurved, adhering to the cup-shaped, fleshy, short nectary which encompasses the germen. *Stam.* Filaments numerous, from seventy to eighty, capillary, longer than the corolla, inserted into the nectary; anthers roundish, small. *Pist.* Cermen superior, roundish, immersed in the nectary; style thread-shaped, the length of the filaments; stigma obtuse. *Peric.* Capsule of five cells. *Seeds* solitary.

Eff. Ch. Calyx five-toothed. Corolla of five petals. Nectary cup-shaped, bearing the filaments. Capsule five-celled, with a seed in each cell.

t. *L. floribunda*. Willd. (Vantanea guianensis; Aubl. Guian. t. 229.)—Found at Guiana, where it is called *Jouantan*, whence Aublet derived his barbarous appellation *Vantanea*. It flowers in August. The trunk of this tree rises to the height of about fifteen or twenty feet, and is much branched. Bark brown and smooth. Wood whitish and compact. *Leaves* alternate, on short footstalks, smooth, oval, pointed, the larger ones about five inches long. *Flowers* forming large, handsome bunches at the extremity of the branches, of a red, coral colour. *Stamens* situated upon a yellow, fleshy disk, in the form of a cup, which almost covers the germen.

Obs. The long narrow petals of this plant greatly remind us of those in the neighbouring genus *Allagium*.

LEMNIUS, or LEMMENS, LÉVIN, in *Biography*, was born at Ziricksee, in Zealand, in May, 1565. He studied at Louvain, and by the advice of his friends applied both to medicine and theology. He principally distinguished himself, however, in the former of these sciences, and practised the profession for upwards of forty years, chiefly in his native place, where he settled in 1527. He obtained the full confidence of his patients by his knowledge and eloquence, and especially by a mild and humane expression of countenance and manner, which never failed to interest the sick. After the death of his wife, Lemnius became a priest, and was made a canon of the church of St. Lieven, at Ziricksee, where he died in July 1568. He was the author of several works, the style of which has some force and even elegance. These are; “*De Astrologia Libri unus, &c.*” *De termino vitæ Libri*. *De honesto animi et corporis oblectamento, &c. &c.*” Antwerp, 1554.—“*De oculitis naturæ miraculis Libri duo,*” *ibid.* 1559.—“*De oculitis naturæ miraculis Libri quatuor,*” *ibid.* 1564. These works contain many observations relative to natural philosophy, botany, physiology, and medicine, and especially concerning generation and monsters; but they also contain many fables. “*De Habitu et Constitutione corporis, quam triviales complexione vocant, Libri duo,*” *ibid.* 1561, and several subsequent editions. “*Similitudinum et parabolarum, quæ in Bibliis ex herbis atque arboribus defumuntur dilucida explicatio,*” *ibid.* 1569; many times reprinted and translated. “*De Zelandis suis Commentariolus,*” Leyden 1611. Eloy Dict. Hist.

LEMNOS, in *Ancient Geography*, an island situated in the Ægean sea. This island was consecrated to Vulcan in the time of Homer, probably on account of two volcanoes, which were here continually casting forth flames, and which were considered as the forges of the husband of Venus. No vestiges of these volcanoes now remain; but Sonnini thinks it probable that interior fires are still burning here; for he met with a spring of hot water, which has been brought to

supply baths, and another of aluminous water. Lemnos was celebrated amongst the ancients, on account of the fœnicœ which it afforded to the Argonauts; of which Apollonius Rhodius has given a particular account. As it was near Asia, it was almost always dependent on that province. The priests of Lemnos were reckoned famous for the cure of wounds. For this reason the Greeks, who went to the siege of Troy, left here Philoctetes, after he had been wounded in the foot by one of the arrows of Hercules. The efficacy of their skill depended, as it has been said, upon the quality of that bole under the denomination of *LEMNIAN earth*; which see. It is also said, that Galen made a voyage to Lemnos on purpose for ascertaining the virtues of this earth; and that he found a person who had availed himself of it as an antidote to the bites of reptiles, and to poison. The first inhabitants of this island were the Pelasgi, who expelled the descendants of the Argonauts, by whom it was previously occupied, and took possession of it about 1160 years before the vulgar era. This island retained the name of Lemnos, by which it is even now known; but navigators have given it the name of *Stalmene*. The island is lully, but extremely fertile; it yields corn, cotton, oil, and silk, with which a few light stuffs are manufactured. To be flourishing, says Sonnini, Lemnos wants only to be delivered from its oppressors. Nature has done every thing for it, and we lament the state of languor and wretchedness to which its destiny has reduced it. Its inhabitants were formerly much given to navigation, or at least to the carrying-trade; they are still trading mariners, because this kind of industry escapes more easily the cupidity of tyrants than affluence produced only by agriculture, or by a sedentary traffic. Some of its women are extremely beautiful. The whole east coast is inaccessible, on account of a shoal, which extends four leagues into the offing; the west coast affords to ships a few places of shelter against northerly winds. To the north is a large road; but there are no real harbours except on the south part, where are to be found two, at no great distance from each other, *viz.* Port *Cadia* and Port *Sant Antonio*. Sonnini's Travels in Greece and Turkey.

LEMO, in *Geography*, a town of Sweden, in the government of Abo; 12 miles N.W. of Abo.

LEMNON, or LIMON, in *Botany, Gardening, &c.* See CITRUS and CITRIC Acid.

LEMON-tree. See CITRUS *Medica*. The name is sometimes given by the Welsh to *Pyrus Aria* of Fl. Brit., the White Beam-tree, whence certain travellers have reported the lemon to be a native of the bleak cliffs of Penmaenawr!

LEMON, in the *Materia Medica*.

Lemons are cooling and grateful to the stomach, quenching thirst and increasing appetite; useful in fevers, as well common as malignant and pestilential; they also provoke urine. The juice, which is more acid than that of the orange, possesses similar medical virtues. (See ORANGE.) This juice, however, is always preferred, where a strong vegetable acid is required. Saturated with the fixed vegetable alkali, it is in frequent extemporaneous use in febrile diseases; and by promoting the secretions, especially that of the surface, proves of considerable service in abating the violence of pyrexia. Mixed with salt of wormwood, it is an excellent medicine to stop vomiting, and to strengthen the stomach. As an antiscorbutic, lemon juice is very generally taken on board ships, destined for long voyages. See CITRUS, and CITRIC Acid.

Whytt found the juice of lemons to allay hysterical palpitations of the heart, when various other medicines had proved

proved ineffectual; and this juice, or that of orange, taken to the quantity of four or six ounces a day, has sometimes been found a remedy in the jaundice. (See Sauanders's Elem. of the Practice of Physic, p. 170.) The yellow rind is a grateful aromatic, and commonly used in stomachic tinctures and infusions, and for rendering other medicines acceptable to the palate and stomach. The lemon peel, though less warm than that of the orange, possesses similar qualities, and is used with the same intentions. It is sometimes ordered to be candied. In distillation it yields an essential oil, extremely light, almost colourless, frequently employed as a perfume, and brought to us from the southern parts of Europe, under the name of "essence of lemons." This oil is an ingredient in the spiritus ammoniac compositus, or aromatic spirit of ammonia, and in other formulae. A mixture made by saturating six drams of the juice of lemons with about half a dram of fixed alkaline salt, with the addition of a small quantity of some grateful aromatic water or tincture, as simple cinnamon water, is given in cases of nausea and reachings, and generally abates, in a little time, the severe vomitings that happen in fevers, when most other liquors and medicines are thrown up as soon as taken. It is also used as a saline aperient in icterical, hydropical, inflammatory, and other disorders. A syrup made by dissolving fifty ounces of fine sugar in a quart or two pounds and a half of the depurated juice, is mixed occasionally with draughts and juleps, as a mild antiphlogistic, and sometimes used in gargarisms for inflammations of the mouth and tonsils. Lewis Mat. Med. Woodv. Med. Bot.

**LEMONADE**, a drink prepared of water, sugar, and citron, or lemon-juice.

This factitious liquor has been so popular in Paris, that it has given its name to a new established company called *lemonnaders*.

**LE MONNIER**, PETER CHARLES, in *Biography*, a French astronomer, member of the Academy of Sciences, and of the National Institute, was born at Paris in 1715, and accompanied Maupertuis in his tour to the north pole, for measuring a degree of the meridian. His principal works are: "Astronomical Institutions;" "Lunar Nautical Astronomy;" "Tables of the Sun, and Corrections of those of the Moon." He died in 1790. He had a brother, Lewis William, a very able experimental philosopher, who died in 1799. But neither of these is to be confounded with an abbé of that name, who translated Terence and Persius into French, and was author of fables, tales, and epistles. He died in 1796.

**LEMOS**, in *Geography*, a district of Spain, in Galicia, E. of Minho; the chief place is Montforte de Lemos.

**LEMOSANO**, a town of Naples, in the county of Molise; 8 miles N.E. of Molise.

**LEMOV**, NIZNEI, a town of Russia, in the government of Penza; 72 miles W. of Penza. N. lat. 53° 25'. E. long. 43° 34'.

**LEMOV**, *Verschnoi*, a town of Russia, in the government of Penza; 38 miles S.W. of Penza. N. lat. 53° 16'. E. long. 43° 14'.

**LEMPA**, a river of Mexico, which runs into the Pacific ocean, N. lat. 13° 36'.

**LEMPACH**, a town of Austria; 14 miles W.S.W. of Vienna.

**LEMPALA**, a town of Sweden, in Tavastland; 27 miles N.W. of Tavasthus.

**LEMPAS**, GRAND, a town of France, in the department of the Ière, and chief place of a canton, in the district of La-Tour-du-Pin; 18 miles N.W. of Grenoble. The place

contains 1680, and the canton 14,883 inhabitants, on a territory of 200 kilometers, in 17 communes.

**LEMPSTER**, an inconsiderable township of America, in Cheshire county, New Hampshire; incorporated in 1761, and containing, in 1800, 729 inhabitants.

**LEMPTA**, a sea-port town of Africa, on the E. coast of the kingdom of Tunis. It was the "Leptis parva" of the ancients; the other being in the kingdom of Tripoli. Lempta appears to have been a mile or more in circuit; but nothing now is left but the ruins of a castle; with a low shelf of rocks, that probably made the northern mound of the ancient Cothon; 60 miles S. of Tunis. N. lat. 35° 30'. E. long. 10° 54'.

**LEMPTA**, a desert country of Africa, inhabited by a barbarous and fierce people, who plunder the caravans that pass from Conflantia and other towns towards Nubia, situated about N. lat. 26° 30'. E. long. 9°.

**LEM-TCHIN**, a town of Thibet; 12 miles W.N.W. of Pitchan.

**LEMUI**, a small island in the Pacific ocean, between the island of Chiloe and the continent. S. lat. 44° 10'.

**LEMVIG**, a town of Denmark, in North Jutland, situated on the Lime-Fiord, or Lympfurd; 84 miles N. of Ripen. N. lat. 56° 44'. E. long. 8° 18'.

**LEMUR**, in *Zoology*, a genus of Primates. The fore-teeth in the upper jaw amount to four in number, the intermediate ones remote; those in the lower jaw to six, their form more elongated, extended, compressed, parallel, and approximate; grinders many, somewhat lobate, the foremost longer, and sharper.

The animals of the lemur genus approach the monkey tribe in the form of their feet, which in several of the species are furnished with flat and broad nails, resembling those of the human hand, excepting generally that of the first finger next the thumb, which is long and incurved; they have either two or four teats, and some of the species have the tail of considerable length, while others have none. Notwithstanding the resemblance these animals bear to the monkey race, they have nothing of the mischievous and petulant disposition of those creatures; they are mild and peaceable in their manners, at least when domesticated, and there are few species of the tribe that cannot readily be reduced to that state of docility by proper treatment. Some of the species feed on fruits, eggs, and small birds, others subsist entirely on the former. They inhabit chiefly the Indian islands, and the continent of South America.

#### Species.

**TARDIGRADUS**. Tail none; body somewhat tawny ash-Gmel. *Lemur tardigradus*, Erxleben. *Le loris grêle*, Audubert. *Slow lemur*, or *loris*.

Under the Linnaean specific name of tardigradus, the best authors appear to have confounded two, if not a greater number of distinct species. The little animal described by Erxleben under that title, is remarkable for the peculiar elegance of its figure, and the singularity of its conformation. The head is roundish; the muzzle projecting; the eyes extremely large and contiguous to each other; the ears large and round; instead of a tail a tubercle is situated in that part; and the whole body is covered with fine hair of a reddish-grey colour. The sexual organs of the female, according to the observations of Daubenton, present some curious particulars of interest to the comparative anatomist. This species inhabits Ceylon, is remarkable for its agility, is quick of hearing, and corresponds with the squirrel.

**ECAUDATUS**. Tail none; a dark-rusty line along the middle of the back from the rump to the forehead; orbits surrounded

## L E M U R.

fringed by a blackish line. *Lemur caudatus*, Linn. Gmel. *Loris tardigradus*, Audebert. *Parvifex pentadactyle de Bengale*, Voimacr. *Le loris de Bengale*, Buff.

The distinction between this and the preceding species has not been regarded with sufficient attention by all writers, and hence we sometimes find the description and history of one applied to and blended with the other. The latter is about thirteen inches in length, the head almost round, the muzzle very little pointed. The ears are small, oval, and straight, and almost entirely concealed under the woolly hair. The eyes are placed in front immediately above the nose, and are very close to each other; their form perfectly orbicular, their size remarkably large in proportion to the body, and of a brown colour. The nose is small, flat, and open at the sides; the teeth of the same form and number as in the former animal. The hair of the fur is long, fine, and woolly, but rough to the touch; the colour in general grey, or yellowish-ash, inclining rather more to reddish upon the flanks and limbs.

**INDRI.** Tailless, black; beneath greyish; rump whitish. *Lemur indri*, Gmel. *Indri*, Sonnerat. *Indri macaoco*, Penn.

This is a very large species; the colour entirely black, except on the face and beneath, which is greyish; and the space of white on the rump, or sometimes the face, is white. The muzzle is lengthened as in the dog tribe, the ears shortish and slightly tufted; the hair silky, thick, and in some parts curly. According to Sonnerat, its first describer, the height of this animal is three feet and a half; the tusks in each jaw are eight, the fore-teeth above two, beneath four; the feet five toed; nails flat and acute, those of the great toe large; the rudiment of a tail is sensible to the touch. It is said to be a gentle, docile animal, capable, like the dog, of being trained when young to the chase, and is commonly employed in hunting by the natives of Madagascar, the country it inhabits: its voice resembles the crying of an infant. At Madagascar it is known by the name of indri, which signifies the man of the wood. Geoffroy observes, that the cutting teeth in the upper jaw are four in number, instead of two, as mentioned by Sonnerat.

**RUFUS.** Yellowish-red; head at the summit, temples, cheeks, and tail beneath whitish. *Lemur rufus*, Audebert. *Maki-roux*, Desm.

This resembles the mongoz in size, and various other respects; it nevertheless differs in having the ears shorter, the tail longer, the hair in general shorter, and the colour of the fur yellowish-red instead of brown-grey; upon the summit of the head is a black line, and the tail at the extremity is brown. Whether allied to the following species or not seems difficult to determine.

**LANGER.** Tailed; above reddish-yellow, beneath white; tail uniformly tawny-brown. Gmel. *Maquis à bourres*, Sonn. *Flacky lemur*, Shaw.

A native of Madagascar; the length twenty-one inches; hair soft, curled, about the loins reddish tawny; face black; ears small; eyes large and greenish-grey; in the upper-jaw two fore-teeth, in the lower four; tail nine inches long; feet five-toed; nails long, great toe-nail rounded. There are two or three supposed varieties of this species.

**POTTO.** Sub-ferruginous; tail same colour. Gmel. *Potto*, Bosman.

Inhabits Guinea. An obscurely described species, conceived to differ from the indri only in the length of the tail. Bosman, who relates the supposed history of this animal, on the authority of the negroes (in his account of Guinea), attributes to it nearly the same manners as those of the European lloth.

**MONGOZ.** Tailed, fuscous-grey, the tail of the same colour. Linn. Erxleb. *Mongoz*, Edw. *Maki mongozes*, Desm. *Mongous*, Buff. *Woolly macaoco*, Penn. *Mongoz lemur*.

The mongoz is a larger species than the ring-tailed lemur, the size about that of the common or domestic cat; the upper part of an uniform dusky-brown colour, with the breast and belly whitish. The fur consists of silky curling hair. The nose is larger than in the ring-tailed lemur, and much resembling that of lemur macao, the colour black; the eyes are yellow, or orange, remarkably vivid, and are nearly surrounded by a circle of black placed at a small distance above and beneath each eye, then uniting between them, and passing down the middle of the front to the nose; the hands and feet are naked and dusky; the nails flat, except on the interior toe of the hind feet next the thumb, which is furnished with a sharp claw; and the tail, which is very long, covered with a thick fur.

No less than seven supposed varieties of this species are described by writers; in one kind the body is grey or brown, with the face and hands black; in another grey or black, with a black spot near the eyes; and in a third the body is brown, with the nose and hands white; the face is also sometimes black, the hands yellow, or varying from that to deep tawny, and the body grey; and again, others occur that are uniformly brown.

This animal is a native of Madagascar and some other Indian islands: it is an active animal, filthy in its dispositions, and feeding on fruits and leaves of trees; it constantly resides in woods: like some other animals, which nature has furnished with a tail of great length, it is observed occasionally to amuse itself by nibbling and biting the end of the tail, and is on this account sometimes found with that part destitute of the four or five extreme vertebrae.

The individual described by Buffon was neither of a gentle nor sportive disposition, and was necessarily confined by means of a chain to prevent its doing mischief; fruits, sugar, and comfits it devoured with apparent eagerness and satisfaction, besides which it was fed on bread; it almost incessantly uttered a low grunting noise, or when tired of being alone, croaked in the manner of the frog, and so loud as to be heard at a great distance. The tongue was rough like that of the cat; and Buffon observes, that when permitted it would lick a person's hand till the skin became inflamed; its caresses, usually concluding with a bite of its teeth upon withdrawing the hand from him. This individual was a male, and from its partiality to cats it was suspected its attachment might have been productive of an hybrid offspring; but these expectations were never realized.

**MACAO.** Tailed, black; collar bearded with a kind of ruff. *Lemur macao*, Linn. Erxleb. *Vari*, Buff. *Maki-vari*, Desm. *Black macaoco*, Edw. *Ruffed macaoco*, Penn. *Ruffed lemur*, Shaw.

An inhabitant of Madagascar, and the adjacent islands; its size exceeds that of the mongoz, and in the ferocity of its manners it very far surpasses that species. Travellers describe it as being scarcely less furious than the tiger; it is dangerous even to be met in the woods by two together, or even one, and yet they sometimes assemble to the amount of a hundred in company, when nothing can resist their attacks. Edwards is the only writer who speaks of it as an inoffensive creature, and the individual he mentions was in a state of captivity; he mentions it as "a very sociable, gentle, harmless-natured animal, not having the cunning, mischievousness, or malice of the monkey kind." The colours of this animal vary much in different individuals, yet are

## L E M U R.

are in general diversified with patches of black and white, though sometimes it appears they are totally white or brown. The voice of this animal is loud and terrible, and is by some compared with the roaring of the lion, or rather its cries resemble those of the howling-monkey of Brasil and Guiana; it delights in sun-shine, and sleeps in dark places. The fur of this animal is long, the muzzle large and rather long, the ears short and fringed with long hairs; and the eyes of such a deep orange as to appear of a fiery redness. The ruff, or cravat-like ring of long fur that surrounds the neck, is peculiarly striking in its appearance, and serves principally to characterize this species; besides which it may be observed, that the great hind-toes are almost subulate. It refuses eggs, flesh, and fish.

**CATTA.** Tail annulated with black and white. Linn. *Erxleb. Mococo*, Buff. *Maki-mococo*, or *maucoco*, Defm. *Maucauco*, Edw. *Ring-tailed maucuco*, Penn. *Ring-tailed lemur*, Shaw. Lev. Mu.

The mococo, says Buffon, is a beautiful animal, with a fine nature. Its size is rather smaller than that of the full-grown cat, the shape more slender; its colour above and on the outside of the limbs somewhat ferruginous, the under parts whitish, and the fur throughout remarkable for its lustre. The eyes are large, of a bright orange, inclining to hazel, and are surrounded by a distinct circle of black; the muzzle is black, and the hands and feet of the same colour; the fingers and toes furnished with round nails, the nails of the great toes not being longer or subulate as in most other species. The tail, which it always carries erect in a graceful position, is very long; the hair upon it longer than the rest of the fur, and marked with about thirty equi-distant or regular distinct circles of black and white.

The manners of this species are gentle and lively, in various respects resembling those of the monkey tribe, without its petulance and malice; when pleased it purrs like a cat. In a state of liberty these animals live in societies of thirty or forty together in the woods; in ascending trees they climb with all their feet like the ape; their food consists of fruits, herbs, and roots, and it is also asserted they will eat animal food; like the squirrel they sometimes feed sitting upright, and often extending their hands forwards, and in the same manner, when in a state of captivity, take their station before a fire to warm themselves. This species inhabits Madagascar.

**BICOLOR.** Blackish, beneath and heart-shaped spot on the forehead white; tail long. *Lemur bicolor*, Gmel. *Lemur albifrons*, Audebert. *Heart-marked maucauco*, Penn. *Heart-marked lemur*, Shaw. Gen. Zool.

Supposed to inhabit South America; the head is obtuse; nails subulate; toes white.

**PUSILLUS.** Grey; eyes large and broad. *Lemur pusillus*, Audebert. *Rat de Madagascar*, Buff. *Maki-nain*, Defm.

This species inhabits Madagascar; its length is five inches and a half from the tip of the nose to the base of the tail; the muzzle shorter than in most other species. An individual of this kind brought from its native country was preserved alive in France for some years. It evinced a remarkable degree of activity in its motions; its cry was feeble like that of the squirrel; and its food consisted of fruits and almonds. The history of this curious little species, as related by Buffon (under the title of *rat de Madagascar*), is erroneously placed by Mr. Pennant, in his work on quadrupeds, under the description of his *Murine maucauco*, by which means the two species are confounded together. Dr. Shaw, from his adherence to this writer, has also fallen into the same opinion in his *General Zoology*.

**MURINUS.** Cinereous; tail tawny. Gmel. *Lemur griseus*, Audebert. *Gristet. Maki-gris*, Defm.

This beautiful little animal is a native of Madagascar. The whole body, except the face, feet, and hands, are covered with greyish woolly hair; the tail is very long, and covered with short woolly hairs, like the rest of the body. It much resembles the lemur *catta* in its general appearance; and the posterior limbs are much higher than those before.

**GALAGO.** Tailed; whitish, beneath grey; tail ferruginous. *Galago*, Gvoff. *Adanson*, &c. *Galago senegalensis*, Audebert.

One of the smaller species of the tribe, measuring six or seven inches from the nose to the tail, the latter eight inches. The ears are very large, thin, upright, and rounded at the tip; the hind legs much longer than the anterior ones; the nails of the hands rounded, except that of the fore-finger of each, which consists of a sharp claw. These animals, according to Adanson, are of a peaceable disposition; they feed on insects, and live in trees. The negroes of Galam hunt them for the sake of their flesh, the flavour of which is, however, very indifferent.

**PSILODACTYLUS.** Rusty cinereous; tail extremely villose; middle finger of the fore-feet very long and naked. *Lemur psilodactylus*, Schreber Suppl. *Aye-aye*, Sonnerat. *Aye-aye squirrel*, Penn.

This is a species allied so nearly to the squirrel tribe, to which it is referred by Gmelin, that it admits of doubt whether Schreber is entirely correct in consigning it to the lemur tribe; and it also approaches very closely the family of monkeys. Its length is eighteen inches, the colour pale ferruginous grey, with a blackish cast on the back and limbs; the tail entirely black, sides of the head, neck, lower jaw, and belly greyish. The head is shaped like that of the squirrel; the ears large, round, and naked, their colour black; and in front of each jaw are two cutting teeth; the feet long; the interior toes of the hind feet short, and furnished with flat round nails. All the claws on the fore-feet sharp and crooked, the two middle ones in particular very long, extremely thin and naked, except at their base. It is a timid animal, uncommonly slow in its movements, and of a mild disposition. M. Sonnerat observes, that its eyes were of an ochre-colour, and resembled those of the owl, and like that bird the animal can scarce see distinctly by day. The individuals kept by Sonnerat lived only about two months; they slept almost continually, and were scarcely to be awakened but by shaking two or three times. Their nourishment consisted of boiled rice which they took up with their long fore-toes, in the manner that the Chinese use their eating sticks. It is a native of Madagascar, where it is rare. Fruits and insects appear to be its usual food.

Some indecision prevails among naturalists respecting the lemur genus, and its immediate affinities; the Linnæan and Gmelinian character is not altogether sufficiently precise, and thus embraces more than one distinct natural genus, of which the galeopithecus (*lemur-volvans*, Linn.) is a prominent example. The number of genera into which Geoffroy divides the lemures is considerable, amounting (independently of the galeopithecii) to no less than five, namely, lemur, indri, lorix, galago, and tarsius. This distribution, with some slight occasional deviations, is adopted by the latest French writers. The genus LEMUR (*maki*) is characterized as having the muzzle very long; four incisive teeth in the upper jaw, beneath six, inclining forwards; grinders tuberculated; ears short, or shortish; tail very long. Under this are retained the Linnæan lemur *catta*, *mongoz*, and *maucaco*; lemur *rufus* of Audebert; lemur *bicolor*.

bicolor (albifrons, Geoff.) and the two little species, called by Geoffroy griseus and pusillus. **INDRI**, the second new genus, consists at present but of two species, the Linnæan *lemur indri* and *laniger*; the former of which is *indri brevicaudatus* of Geoffroy; and the latter *indri longicaudatus* of the same author. There have the muzzle very long; in each jaw four incisive teeth; the upper ones standing distant in pairs; and grinders tuberculated; in other respects they resemble the *lemur*. In the genus **LORIS** the head is rounded, the muzzle short; incisive teeth in each jaw four, the lower ones directed forwards; eyes very open; ears moderate; nostrils situated on the sides of the nose; no tail, but in its place a tubercle; pectoral teats four; this consists of two species, *lemur tardigradus*, Linn.; and *lemur gracilis*, Geoff. **GALAGO**, the fourth genus, is distinguished by the rounded form of the head, short muzzle, two incisive teeth in the upper jaw, very remote; in the lower one six; grinders with pointed tubercles; nostrils placed at the sides of the nose; ears naked, sometimes very large; anterior legs short, posterior ones elongated; second finger of the hind feet shorter than the rest; tail longer than the body, and hairy; scrotum very large. This comprehends *galago senegalensis* of Geoffroy, and *le petit galago*, (*lemur minutus*, Cuvier.) **TARSIS** is the last of these new genera; its character consists in having the head rounded; muzzle a little prolonged; in the upper jaw four incisive teeth, in the lower only two; canine teeth several, and shorter than the incisive ones; the grinders with pointed tubercles; posterior shanks uncommonly long; tail long and tufted; ears large and naked. This genus, which can scarcely, perhaps with propriety, be referred to the *Gmelinian* *lemur*, although partially ascribed to by some authors, comprises *tarsius daubentonii* of Geoffroy (*lemur tarsius*, Pallas), and *didelphis macrotarsus*, Gmel.; with two others, one *lemur spectrum* of Pallas, the other *tarsus Fischerii*, Nob.; a species very recently described, and named *Fischerii* after professor Fisher, by whom it was first introduced to general observation.

**LEMURES**, in *Antiquity*, *sprites* or *hobgoblins*; restless ghosts of departed persons, who return to terrify and torment the living.

These are the same with *larvæ*, which the ancients imagined to wander round the world to frighten good people, and plague the bad. For which reason, at Rome they had *Lemuria*, or feasts instituted to appease the manes of the defunct. See **LARES**.

Apuleius explains the ancient notion of *manes* thus: the souls of men, released from the bands of the body, and freed from performing their bodily functions, become a kind of demons or genii, formerly called *lemures*. Of these *lemures*, those that were kind to their families, were called *lares familiares*; but those who, for their crimes, were condemned to wander continually, without meeting with any place of rest, and terrified good men, and hurt the bad, are vulgarly called *larvæ*.

An ancient commentator on Horace mentions, that the Romans wrote *lemures* for *remures*; which last word was formed from *Remus*, who was killed by his brother *Romulus*, and who returned to earth to torment him.

But Apuleius observes, that in the ancient Latin tongue *lemures* signifies the soul of a man separated from the body by death.

**LEMURIA**, or **LEMURALIA**, a feast solemnized at Rome on the ninth of May, to pacify the manes of the dead, or in honour of the *lemures*.

The institution of this feast is ascribed to *Romulus*, who, to rid himself of the phantom of his brother *Remus* (whom

he had ordered to be murdered) appearing always before him, ordained a feast, called after his name *Remuria*, or *Lemuria*.

In the *Lemuria*, they offered sacrifices for three nights together, during all which time all the temples of the gods were shut up, nor were any marriages permitted. There were many ceremonies in this feast, chiefly intended to exorcise the *lemures*, and prevent their appearing, or giving any disturbance to the living.

**LENA**, in *Geography*, the greatest river of Eastern Siberia. It takes its origin on the north-western side of the *Baikal*, in a morass; runs at first northwards, then to the district of *Yakutsk* eastwards, and lastly towards the north, where, after having divided itself into five great branches at its mouth, and thereby formed four considerable islands, it flows into the Frozen ocean. Its course is computed to be 5000 versts. Its source is in N. lat. 52° 30', its mouth in 73° lat., and the eastern arm in 153, and the western in 143° of longitude. This river has in general a very gentle current; its bottom is mostly sandy, and the shore only in the upper regions beset with hills and cliffs. Of the numerous rivers which it takes up in its course, the largest are the *Vitim*, the *Olekma*, the *Viluy*, and the *Aldan*. Out of the *Lena* travellers pass into the *Aldan*, from that into the *Maia*, from the *Maia* into the *Yadoma*, and from this they have but a short route to make by land to *Okhotsk*. *Tooke's Russ. Emp. vol. i.*

**LENA**, a harbour on the W. coast of *Mindanao*. N. lat. 6° 42'. E. long. 122° 12'.

**LENÆA**, *Λνωια*, in *Antiquity*, a festival of *Bacchus*, surnamed *Lenæus*, from *λενωια*, i. e. a wine-press. Besides the usual ceremonies at feasts sacred to this god, it was remarkable for poetical contentions, and tragedies acted at this time. *Potter's Archæol. lib. ii. cap. 20. tom. i. p. 412.*

**LENATO**, in *Geography*, a town of Italy, in the department of the *Olonæ*; 5 miles S. of *Milan*.

**LENBERAN**, a town of *Perlian* *Armenia*; 168 miles E. of *Erivan*.

**LENCLOISTRE**, a town of France, in the department of the *Vienne*, and chief place of a canton, in the district of *Châtelleraut*; 14 miles N. of *Poitiers*. The place contains 2114, and the canton 7350 inhabitants, on a territory of 182½ kilometres, in nine communes.

**LENCLOS**, ANNE, or **NINON DE**, in *Biography*, an illustrious woman, born at *Paris* in 1616, was daughter of the sieur *De l'Enclos*, a gentleman of *Touraine*, who had served with reputation in the army; her mother was a devotee. She lost both her parents at the age of fifteen, and being left mistress of a large fortune without any one to controul her, she determined to adopt a mode of life suited to her inclinations. She had already derived her philosophy from the works of *Charron* and *Montagne*: she was beautiful, and by much attention became very accomplished, and qualified for the company of the most cultivated persons of her time. Amorous in her constitution, and licentious by principle, she resolved to give free indulgence to the tender passion, without the shackles of a serious engagement. She never sold her favours; and her attachments seem partly to have been prompted by personal attractions, and partly by vanity, as they included persons of high rank and reputation, as well as men of gallantry and fashion. She was complimented and consulted by the most eminent writers of that time, and her friendship was sought by some of the most respectable of her own sex. She was intimate with *madame de Maintenon*, when the wife and widow of *Scarron*, who wished to engage *Ninon*

to live with her, when a partner in the throne, to dispel the dreadful enmity which was the price of her elevation. Ninon preferred her liberty to the prison of a palace, and as she retained her personal charms to a late period, and her mental attractions to the close of life, she was very long the object of admiration, and had the honour of forming more than one generation of young men of fashion. Mothers, so licentious was the age, were pleased to see their sons in her train, as she always promoted decorum, and the air of good company; and it was universally admitted that she was capable of disinterested friendship to those who confided in her. If she were an object of envy to bye-standers, she was, at the same time, conscious of having mistaken the way to true happiness; for in one of her letters to St. Evremont, she says, "Every one tells me that I have less to complain of time, than any other person. However that may be, if such a life, as I have spent, had been proposed to me as my lot, I would have hanged myself rather than have passed through it." She died at the age of eighty. She is reputed to have been the author of a set of letters to the marquis de Sevigné. Some of her real ones are contained in the works of St. Evremont. Moreri.

LENCZICZ, or LENTSCHITZ, in *Geography*, a town of the duchy of Warlaw, formerly capital of a palatinate of the same name in Poland; surrounded with a wall and moat, and defended by a castle placed on a rock. A provincial diet, a court of judicature, and provincial synods of the clergy, are held in this town; 60 miles W.S.W. of Warlaw. N. lat. 51° 52'. E. long. 19° 17'.

LENCZNA, a town of Poland, in the palatinate of Lublin; 16 miles N.E. of Lublin.

LENDAR, a town of Iltria; 19 miles E. of Capo d'Iltria.

LENDENARA, a town of Italy, in the Polse di Rovigo; containing two churches and four convents; 8 miles W. of Rovigo.

LENDORA, a town of Russia, in the government of Olonetz; 100 miles W.N.W. of Povenetz.

LENE LOUGH, a lake of Ireland, in the county of Westmeath, near the small town of Fore.

LENES, a small island in the North sea, near the coast of Norway. N. lat. 67° 40'.

L'ENFANT, DAVID, in *Biography*, a French Dominican friar, was born at Paris in the year 1603. He embraced the ecclesiastical life at the age of seventeen, and manifested a most ardent thirst for knowledge, together with very uncommon literary industry. He died in the year 1688, at the age of eighty-five. His principal work is "A General History of all Ages," in three vols.; which was afterwards extended to six volumes. He also published "Sancti Bernardi Abbatis Biblia," containing a collection of all the illustrations of texts of scripture dispersed throughout the works of that author; and similar works respecting biblical illustrations of St. Augustine, and St. Thomas Aquinas. Moreri.

L'ENFANT, JAMES, an eloquent as well as very learned French Protestant divine, was born at Bazoché in the year 1661. He pursued his theological studies at Saumur, under Lewis Cappel, professor of Hebrew, and afterwards at Geneva. In 1683 he left Geneva, and was admitted in the following year to the exercise of the ministry at Heidelberg, and ordained pastor of the French church in that place. Owing to his superior pulpit talents he was appointed chaplain to the dowager electress palatine. In 1688, on the invasion of the palatinate, he removed to Berlin, and was appointed pastor of one of the churches. He was in a short

VL. XX.

time nominated preacher to the queen of Prussia. In 1707 we find him in England, and nominated one of the chaplains to queen Anne, an honour which he declined on account of his great attachment to Berlin. He died in 1728, at the age of sixty-seven. His publications were numerous in divinity, ecclesiastical history, criticism, and polite literature. Those which are held in the highest estimation are his "Histories of the Councils of Pisa, Constance, and Basil." These histories are written with great ability and impartiality, and they abound with interesting facts and curious researches. L'Enfant, in conjunction with M. Beaufoire, published "The New Testament translated from the original Greek into French," in two volumes 4to. with notes, and a general preface, or introduction to the reading of the holy scriptures, useful for students in divinity. He is known also by his "De Inquirenda Veritate," which is a translation of Malebranche's "Search after Truth;" "The History of Pope Joan;" "Poggiana, or the Life, Character, Opinions, &c. of Poggio, the Florentine, with the History of the Republic of Florence," and other works. Moreri.

LENGA DE BAZARA, in *Geography*, a province on the coast of Caramania. N. lat. 36° 33'. E. long. 34° 11'.

LENGEFELD, a town of Saxony, in the circle of Erzgebürg; 12 miles S.E. of Chemnitz. N. lat. 50° 40'. E. long. 13° 7'.

LENGEFELD, or *Lengensfeld*, a town of Saxony, in the Vogtland; 10 miles S.S.W. of Zwickaw. N. lat. 50° 27'. E. long. 12° 22'.

LENGER, a town of Persia, in Khorasan; 162 miles N.N.W. of Herat.

LENGER *Kuran*, a town of Persia, in Ghilan; 120 miles N.W. of Reshd.

LENGFURT, a town of Germany, in the county of Wertheim; 12 miles S.S.W. of Wertheim.

LENGHIER, a town of Persia, in Khorasan; 70 miles E. of Herat.

LENGHIA, a town of Sweden, in West Gothland; 42 miles E. of Gothenburg.

LENGLET, DU FRESNOY, NICHOLAS, in *Biography*, was born at Beauvois in 1674. He applied himself particularly to the study of theology, and composed several works in a strain of freedom, which attracted the censure of the Sorbonne, and other established bodies. Disgusted with the opposition which he met with, he quitted divinity for politics, and in 1705 was sent by Torcy, minister for foreign affairs, to reside at the court of the elector of Cologne, as secretary for the Greek and Latin languages. He was entrusted with the management of the foreign correspondence with Brussels and Holland, by means of which he became acquainted with various plots against the French interest. Lenglet returned to France at the conclusion of the war, and employed himself in many literary works. In 1721 he went to Vienna, and was appointed librarian to prince Eugene, a post which he did not long retain, on account of some misconduct. Owing to this circumstance, he always remained in indignance, though he had friends that would have raised him to a better condition. Some of his writings were composed in so free a style as to cause the author to be imprisoned several times in the Bastille. He was accidentally burnt to death in the year 1755, in his eighty-second year. Of his various works we may notice those which are most esteemed, *viz.* "Méthode pour étudier l'Histoire, avec un Catalogue des principaux Historiens," 12 vols.; "Méthode pour étudier la Géographie," with maps; "Histoire de la Philosophie Hermetique," and "Tablettes Chronologiques de l'Histoire Universelle," two vols. 1744. An enlarged edition

edition of this work was published in 1777, by Bruyere, to which we have been indebted in the course of our inquiries. Mereri.

LENGO SPERANNO, in *Geography*, a town of Africa, in Congo; 45 miles S.S.W. of Bombi.

LENGTIL, in the *Manege*. *To passage a horse upon his own length*, is to make him go round in two treads, at a walk or trot, upon a spot of ground so narrow, that the horse's haunches being in the centre of the volt, his own length is much about the semidiameter of the volt; the horse still w-rings between the two heels, without putting out his croupe, or going at last faster or slower than at first.

LENGTHENING, in *Naval Architecture*, is the operation of separating a ship athwart the midships, and adding a certain portion to her length. It is performed by clearing all the fallings near the butts of those planks as may be retained, and the others are cut asunder. The after end is then drawn or lunched apart to the required distance. The keel is then made good, and a sufficient number of floors erected, and timbers raised to fill up the vacancy produced by the separation. The keelson is then replaced to give good shift to the carfs of the keel. The planks on the outside are then replaced with a proper shift, also the clamps and foot-waling inside. As many beams as are necessary are next placed athwart and kneed, the decks made good, and the ship completed in all respects as before. Sometimes ships are shortened in a similar manner.

LENGUR, in *Geography*, a town of Persia, in the province of Mazanderan; 15 miles N.W. of Amol.

LENHOFDA, a town of Sweden, in the province of Smaland; 30 miles N.W. of Calmar.

LENIOR, a county of America, in Newbern district, North Carolina, surrounded by Glasgow, Craven, Jones, and Dauphin; containing 3898 free inhabitants, and 1457 slaves. The chief town is Kingston.

LENIS SPIRITUS, in *Profody*. See SPIRIT.

LENITIVE, in *Physic*, sometimes denotes a softening, resolutive remedy, that moistens the parts diseased, and diffuses any sharp humour collected there.

LENITIVE is more frequently used for laxative.

LENITIVE Elixuary is more peculiarly used for a gentle purging electuary. See ELECTUARY of Senna.

LENKERAN, in *Geography*, a town of Persia, in the province of Ghilan, near the Caspian sea. N. lat. 28° 40'. E. long. 49°.

LENNAN, LA, a town of Peru, in the diocese of La Paz; 27 miles N. of Potofi.

LENNEP, a town of the duchy of Berg, inhabited for the most part by Lutherans; 20 miles E.S.E. of Dusseldorf. N. lat. 51° 0'. E. long. 7° 18'.

LENO, a harbour on the W. coast of the island of Mindanao.

LENNICK-SAINTE-MARTIN, a town of France, in the department of the Dyle, and chief place of a canton, in the district of Brussels. The place contains 1559, and the canton 10,606 inhabitants, on a territory of 120 kilometres, in 12 communes.

LENOS, in Hippocrates, denotes an old machine for reducing fractures and dislocations.

LENOX, in *Biography*. See RICHMOND, Duke of.

LENOX, in *Geography*, an island in the Mergui Archipelago, about five miles in circumference. N. lat. 6° 2'.

LENOX, the shire town of Berkshire county, Massachusetts; it is a pleasant and thriving town, and has a court house and a gaol. The river Housatonic traverses the town; 145 miles N. of Boston. The number of inhabitants is 1041.

LENOX Castle, a post-town of Buckingham county, North Carolina; 290 miles from Wallington.

LENS, in *Dioptrics*, properly signifies a small, roundish glass, of the figure of a *lentil*; but is extended to any detached portion of a transparent substance, of which the opposite sides are regular polished surfaces of such forms as may be described by lines revolving round a common axis; or to any optic glass, not very thick, which either collects the rays of light into a point, in their passage through it, or disperses them farther apart, according to the laws of refraction. A lens is generally supposed, in simple calculations, to be infinitely thin, and to be denser than the surrounding medium.

Lenses have various figures; that is, are terminated by various surfaces, from which they acquire various names. The lines that form them may be portions of circles, of ellipses, of hyperbolas, or of any other curves, or they may be right lines. But, in general, one of the sides is a portion of a spherical surface, and the other either a portion of a spherical surface or a plane. Hence some are plane on one side, and convex on the other; others convex on both sides; both which are ordinarily called *convex lenses*; though, when we speak accurately, the former are called *plano-convex*, and the latter, *double convex*. Again, some are plane on one side, and concave on the other; and others are concave on both sides, which are both usually ranked among the *concave lenses*; though, when distinguished, the former is called a *plano-concave*, and the latter, a *double concave*. Others, again, are concave on one side, and convex on the other; which are called *convexo-concave*, or *concavo-convex lenses*. The figures of all these are sufficiently described by their names (see also *Plate VI. Optics, fig. 5.*); except that the term *meniscus*, which properly implies a little moon or crescent, is applied in general to all lenses which are convex on the one side, and concave on the other, although they may be thicker at the edges than in the middle. Sometimes, however, a lens of this kind is distinguished by the term *convexo-concave*. See MENISCUS.

When the particular figure is not considered, a lens that is thickest in the middle is called a *convex lens*; and that which is thinnest in the middle is called a *concave lens*, without farther distinction.

It is to be here observed, that in every lens terminated in any of the aforementioned manners, a right line perpendicular to the two surfaces is called the *axis* of the lens; which axis, when both surfaces are spherical, passes through both their centres; hence it is manifest, that no lens, except the sphere, can have but one axis; and therefore all pencils of rays are oblique, excepting those whose foci are in the axis of the lens; but if one of them be plane, it falls perpendicularly upon that, and goes through the centre of the other. The points where the axis cuts the surface are called the *vertices* of the lens, and the middle point between them is called the *centre*. This is the case, when the lenses are thin, as they are usually supposed to be; but when the lens is pretty thick, and its surfaces of unequal curvatures, then the centre of the lens is nearer to one vertex than to the other; by as much as the radius of curvature of the former surface is less than that of the other.

For the explanation of other terms that pertain to lenses, and of their general effect, it is obvious, that if a ray of light falls perpendicularly upon the vertex of a lens, or coincides with its axis, it must pass straight through the lens without suffering any refraction; but when it falls obliquely upon it, it must emerge out of the lens in a direction inclined to its former direction. Thus, if the rays of light, which,

issuing from the luminous point A, (*Plate VI. Optics, fig. 6.*) fall upon the lens B E, the ray A C, which proceeds in the direction of the axis of the lens, must pass straight through it; but the ray A B, falling obliquely upon the surface of the lens, must be refracted, or bent, and if the lens be a plano-convex, or double convex, that ray must be bent inwardly, that is, towards the axis; consequently it must intersect the axis in some point, as F. This point F is called the *refracted focus* of that ray, or rather of the rays A B, A E, &c. which fall upon the lens at equal distances from the axis A C, and which all meet and cross at the same point F; but the point A from which they issue, is called the *radiant point*, or the *focus of incident rays*; and both these points, in reference to each other, are called the *conjugate foci*. If a lens be concave, as in *fig. 7*, then the oblique rays A B, A E, &c. will be bent outwardly, or from the axis; in which if the refracted rays be supposed to be continued backwards until they meet the axis as at F, then the point F is called the *virtual focus of the refracted rays*, being in fact the centre of divergency of the rays. In this case the conjugate foci are both on the same side of the lens; viz. the real focus of incident rays, and the virtual focus F of the refracted rays B G, D O, E S. It is to be observed, that all the rays which fall upon the surface of a lens, whether it be convex or concave, will not meet at one and the same point when the lens is convex, nor have a common virtual focus when it is concave: but those rays which are more distant from the axis, after the refraction, meet sooner than those which are nearer to the axis; and this effect is greater in proportion as the surfaces of the lens are farther from each other, and consist of larger spherical segments. Hence a glass globe renders the above-mentioned effect very conspicuous; and hence the lenses are made as thin as possible; but in all cases, a lens which consists of spherical surfaces, does never refract the rays which fall from a luminous point, precisely to the same focus. The rays which fall upon the edge of the lens have their refracted focus not only nearer to the lens, but also farthest from the axis, viz. on one side of it. Lines drawn through the refracted foci of the rays, which belong to one luminous or radiant point, form two curves, which make an angle with each other at the axis, or principal focus, and are called "caustics by refraction" (see CAUSTIC); which are real in convex lenses, but imaginary in those that are concave. When the lenses are thin, and their sphericity not very great, these caustics are so trifling that the eye does not perceive them; but lenses that are thick and of great convexity produce a considerable aberration of the rays, and an evident distortion of the object to an eye that looks through them. This aberration may be exhibited experimentally by covering one side of a glass globe or thick lens with a circular piece of brown paper, having a row of equidistant pin-holes in its diameter. Let the light which passes through these holes, and through the lens, fall upon a piece of white paper held perpendicular to the rays of light, and you will find that when the paper is held near to the globe or lens, the spots of light upon it are at equal distances from one another successively; but if the paper be gradually withdrawn from the lens, the intervals between the exterior spots grow less than the intervals between the interior, and soon unite. If the same operation be performed with a thick concave lens, the intervals between the exterior spots will be found to grow larger than the interior, &c. There is another aberration, resulting from the different refrangibility of the rays of light; and which causes a much greater imperfection in lenses. For an account of both, see ABERRATION. Notwithstanding these

aberrations, glass lenses, that are not very thick, are reckoned to have a determinate focus of refracted rays, originally issuing from a single radiant point; and the distance of that focus from the surface of the lens is called the *focal distance* of these rays. In order to prepare the way for determining their focal distance, it may be considered, that about the middle of the surface of every lens there is a point, upon which, if a ray falls and passes through the lens, the emergent part will be parallel to the incident; for the point of incidence and the point of emergence may be so situated, that if two planes touch the surfaces at these points, they may be parallel to each other. That ray or part of a pencil of light, which thus passes through the lens, without being bent, is called the *axis of that pencil*, and this axis passes through the *centre* of the lens. When rays of light fall upon the same lens with different inclinations, it is evident that after the refraction, they must have their foci at different distances from the lens. When rays of light come parallel to each other, such as those which come from a point of the sun's surface, or from any other distant point, and fall perpendicularly, or nearly so, upon the surface of a lens; then the focus of these rays, after refraction, is called the *geometrical focus*, or the *principal focus* of that lens, and its distance from the lens the *principal focal distance* of that lens. The principal focus of a lens may be found either experimentally or by computation. In a plano-convex, double-convex, or meniscus, the principal focus is real; in the other lenses the focus is virtual. See the *Theory of Lenses demonstrated under REFRACTION and DIOPTRICS*, and the application thereof under MICROSCOPE, TELESCOPE, BURNING-GLASS, and FOCUS.

Some confine lenses within the diameter of five or six lines, and will have such as exceed that diameter called *lenticular glasses*.

Lenses are distinguished, with regard to the manner of their preparation, into *ground* and *blown*.

LENSES, *Blown*, are little globules of glass, melted in the flame of a lamp, or taper. See MICROSCOPE.

LENSES, *Manner of grinding*. A little piece of copper is cemented to the end of the arbor of a lathe, and turned till it form a Dish, or bason, of the diameter of the lens required. Then a piece of clear glass is cemented, on one of its flat sides, to the end of a little maundrel, with black Spanish wax; and thus ground, on the side not cemented, on a grindstone, with water, till it hath nearly acquired a convex figure. It is finished in the lathe, by turning it in the bason, with fine wet sand, grit-stone, or emery. The grit must be often repeated fresh till the lens appear very round; when it is come to that point, they cease to take any fresh stone, but continue to turn it in the bason, till the remains of the sand are become so fine as to have polished it. This they perceive, when, upon wiping it, the image of the window of the place is seen painted on its surface; if it does not, it is wetted in water without any sand, and turned till it hath got a polish. The bason is then covered, within-side, with two or three folds of linen, and the polish finished with putty, or tripoly of Venice steeped in water. It is known to be perfectly polished, when, viewing it with a magnifier, there appear no scratches of the sand. The cement is then broken off, and the side polished cemented, to work and grind the other, as before, till the edges of the lens be become sharp, and it be perfectly polished on either side. When finished, it is washed in spirit of wine, to take off all remains of the wax.

According to the mode now generally practised, optical glasses are fixed on blocks by means of a cement, and ground with emery by a tool of proper convexity or concavity;

cavity; if they are small, a large number is fixed on the blocks at the same time. The tool is sometimes first turned round its axis by machinery, and when the lenses are to be finished, a compound motion is given to it by means of a crank; and in order to make it more smooth, the wheels turn each other by brushes instead of cogs. The point of the lens where its two surfaces are parallel, is determined by looking through it at a minute object, while it is fixed on a wheel with a tubular axis, and shifting it, until the object appears no longer to move; a circle is then described, as it revolves, in order to mark its outline. The dishes in which lenses are sometimes ground are of bell metal; and the emery is prepared by elutriation.

In the Philosophical Transactions we have the figure of a machine for grinding lenses spherically. It is a contrivance to turn a sphere at one and the same time on two axes, intersecting each other at right angles, with an equal velocity and pressure on each. See the Transactions, N<sup>o</sup> 459. sect. 1. See GRINDING of *Optic Glasses*.

LENSES, for convex, the laws of their refraction, and their effects depending thereon, are as follow.—1. A ray of light, E G, near the axis (*Plate VI. Optics, fig. 8.*), and parallel to it, striking on the plane surface of a plano-convex lens, directly opposite to the luminous body, after refraction concurs with the axis in the point F: and if C be the centre of the convexity, C F will be to F L, that is, the distance of the centre from the point of concurrence, or focus, will be to the distance of the centre, from the convex surface, in the ratio of the refraction.

For the plane surface being directly opposed to the luminous body, the ray E G is perpendicular to A B, and therefore will pass unrefracted to H: thus it strikes on A H B, still parallel to the axis; and therefore coming out of a denser medium into a rarer, it will meet with the axis of the lens in F: and so as that C F will be to F L in the ratio of the sine of the refracted angle to the sine of the angle of incidence: as will be demonstrated under the head REFRACTION.

And, therefore, C F — F L, or C L is to F L as the difference of these sines is to the sine of the angle of incidence; and C F — F L, or C L is to C F as the same difference is to the sine of the refracted angle.

If then the refraction be out of a glass lens into air, C F: F L :: 3 : 2, or C L: F L :: 1 : 2, and C L: C F :: 1 : 3; and therefore F L = 2 C L; that is, parallel rays, near the axis, will concur with it at the distance of the diameter. Moreover, if parallel rays pass out of air into glass, it will be C F: F L :: 2 : 3, and C L: F L :: 1 : 3; and C L: C F :: 1 : 2. It is evident from hence, that if C L be diminished, without any variation in the refracting power, F L would also be diminished. Again, if the refraction were out of a water lens, *i. e.* out of a plano-convex lens filled with water, C F: F L :: 4 : 3, or C L: F L :: 1 : 3; and therefore F L = 3 C L; *i. e.* parallel rays, near the axis, will concur with it at the distance of a diameter and a half. It is easy to deduce the effect of refraction out of air into water. So that if a lighted candle be placed in the focus of a plano-convex lens, that is, in the point F, distant from the surface of the lens A L B, by the length of the diameter; and from the surface of the water lens by a diameter and a half, its rays, after refraction, will become parallel.

2. If the ray K I, (*Plate VI. Optics, fig. 9.*) near the axis of a plano-convex lens, and parallel to it, strike on its convex surface A H B, after a double refraction, it will meet the axis in F; so as that H G will be to G C, and G D to F D, in the ratio of the refraction.

For the ray K I, parallel to the axis E G, by virtue of

the first refraction in I, will tend to the point G, so that G H will be to G C in the ratio of the sine of the angle of incidence to the sine of the refracted angle: therefore, by virtue of the second refraction in L, it will concur with the axis in F; so that G D will be to F D in the ratio of the sine of the refracted angle, to the sine of the angle of incidence. See REFRACTION.

So that the semidiameter, and thickness of the plano-convex lens, with the ratio of refraction, being given, we shall have a method of determining the focus of parallel rays striking on the convex surface. For, if the ratio of refraction be expressed by  $n : m$ , H G : G C ::  $n : m$ ;

therefore  $n - m : n :: H C : H G$ ; and  $H G = \frac{n}{n - m}$

× H C: from which subtracting the thickness of the lens,

D H, and G D =  $\frac{n}{n - m} \times H C - H D$ . Then since

the ratio of G D to F D is the given ratio of refraction,

F D =  $\frac{m}{n - m} C H - \frac{m}{n} H D$  = (rejecting the quantity

$\frac{m}{n} H D$  as very small)  $\frac{m}{n - m} C H$ .

Hence, if the lens be glass, F D = 2 C H —  $\frac{2}{3}$  H D. So that if two thirds of the thickness of the lens be inconsiderable, (as in practice it usually happens,) parallel rays meet with the axis at the distance of the diameter from the lens, even when they strike at a convex surface.

So that, as to the place of the focus, it is the same thing whether the plane surface, or the convex one, be turned to a luminary of parallel rays; though it appears, both from experience and trigonometrical calculations, that there are more rays united in a lens space, if the convex surface, than if the plane one, be turned towards the sun.

If the lens were full of water, F D = 3 C H —  $\frac{2}{3}$  H D, and therefore, if  $\frac{2}{3}$  H D be inconsiderable, F D = 3 C H, or if  $\frac{1}{4}$  H D be inconsiderable, F H = 3 C H. Parallel, and near rays, therefore, are united at the distance of a diameter and a half, if the refraction be in water, even when the convex surface is opposed to the luminous body.

3. Hence, also, arises a method of determining the focus of parallel rays striking on a lens convex on both sides, the two semidiameters, and the thickness of the lens, being given.

For if the ray H I, (*Plate VI. Optics, fig. 10.*) near the axis D G and parallel to it, fall on a lens convex on both sides, after a double refraction, it will meet the axis in F, provided that G E : G C and D K : D O have the ratio of refraction. And G D will be to G K as G O to G F. Since E G : G C in the ratio of refraction, the ray H I will tend to the point G; and if D K be to D O in the ratio of refraction, after the second refraction at its egress, it will meet the axis in F, and G D : G K :: G O : G F. See REFRACTION.

And therefore, G D : D K :: G O : F O. Let the ratio of refraction be that of  $n : m$ , then G E : G C ::  $n : m$ , and D K : D O ::  $n : m$ ; and, therefore,  $n - m : n :: C E : G E$ , and  $n - m : n :: K O : D K$ ; wherefore if the ratio of refraction and the semidiameters C E and K O are given, G E and D K may be found: and since G D = D K + E G — E K, and G K = G E — E K, and G O = G E + K O — E K, and G D : G K :: G O : G F; and G F may be found: moreover G E — G F = E F. If E K be rejected as very small, G D = D K + E G, G K = G E, and G O = G E + K O; and therefore, D K + E G : G E :: G E + K O : G F.

Hence, if the lens be glass, since  $GE = 3 CE$ , and  $DK = 3 KO$ ,  $3 KO + 3 CE : 3 CE :: 3 CE + KO : GF$ ; consequently  $KO + CE : CE :: 3 CE + KO : GF$ . And substituting for  $KO$ ,  $a$ ,  $CE$ ,  $b$ , and  $GF$ ,  $x$ ,

$$x = \frac{3bb + ab}{a + b}, \text{ and FE or FK, (rejecting E K) } = 3b - \frac{3bb + ab}{a + b} = \frac{3ab + 3bb - 3bb - ab}{a + b} = \frac{2ab}{a + b};$$

therefore the sum of the semidiameters  $KO + CE$  is to the double of one of them, or  $2 CE$ , as the other  $KO$  is to  $FK$  the distance of the focus from the lens.

If the glass lens were equally convex on both sides, then  $KO = CE$ , and  $2 CE : CE :: 4 CE : GF$ , and therefore,  $GF = 2 CE$ ; and  $FK = \frac{2a^2}{2a} = a = EC$ ; *i. e.*

the distance of the focus from the lens is equal to the radius of convexity.

If the lens were full of water, since  $GE = 4 CE$ , and  $DK = 4 KO$ ,  $4 KO + 4 CE : 4 CE :: 4 CE + KO : GF$ ; consequently  $KO + CE : CE :: 4 CE + KO : GF$ . Wherefore substituting as before  $x = \frac{4bb + ab}{a + b}$ ,

and  $FE$  or  $FK = 4b - \frac{4bb + ab}{a + b} = \frac{3ab}{a + b}$ ; consequently the sum of the semidiameters  $KO + CE$  is to the triple of either,  $3 CE$ , as the other  $KO$  is to  $FK$ , the distance of the focus from the lens.

If this lens were equally convex on both sides, we should have  $2 CE : CE :: 5 CE : GF$ ; therefore  $GF = \frac{5}{2} CE$ ; and  $FK = \frac{3aa}{2a} = \frac{3}{2} a$ ; *i. e.* the distance of the focus from the lens is  $\frac{3}{2}$  of the radius.

In order to find the principal focus of a plano-convex, or double convex lens experimentally, various methods have been devised and recommended. One is as follows: Measure exactly the thickness of the lens in the middle and at the edge, and also its breadth; then it will be, as the difference of the above thicknesses is to half the breadth, so is half the breadth to the focal length required. The following method will serve, according as the centres of the sides are on different sides or on the same side of the lens; as the sum or difference of the radii of the sides is to one of them, so is double the other to the focal distance from the lens. If the curvity of each side is the same, the radius of that curvity may be deemed the focal length; and if one side of the lens is plane, the focal length may be reckoned equal to twice the radius of the spherical side. The focal length of a convex lens may be also found by the following methods: darken a room, so that no light shall enter into it except through a tube in one of the window-shutters; then, placing the lens against and close to this hole, move a white paper behind it, till the picture of a particular object, directly facing the lens, appears most distinct, and there fix the paper; then measuring the distances betwixt the paper and the object from the lens respectively, there will be sufficient data for finding the focal length required. Let  $QP$  (*fig. 11.*) be the object without doors,  $A$  the lens in the window-shutter,  $qp$  the place of the paper where the image of  $QP$  is most distinct, and  $QAq$  the axis of the lens. Having measured the distances  $QA$ ,  $qA$ , it will be,  $Qq : QA :: QA : QF$ ; and  $QA - QF = AF$  the focal length required.

The focal length of any lens, it is observed, is in strictness the distance from its principal focus to the respective focal centre: in the example above given, the distances betwixt the focal centres of the lens should have been subtracted from  $Qq$ ; and for  $QA$  we should have taken the distance from  $Q$  to the nearest focal centre. But in experiments of this kind, these niceties would be superfluous. Moreover, in the above experiment, there will be a certain part of the axis, extending on each side of the geometrical focus  $q$ , within which, wherever the paper is placed, the picture as to sense will be equally distinct. Having found nearly the place of  $q$ , move the paper from thence both ways along the axis, till an indistinctness begins to be perceptible in a particular final part of the picture; and having noted these two places, the middle point between them may be taken for the focus  $q$ . Again, if the focal length of the lens does not exceed two or three feet, it may be found without darkening the room, by holding the lens at such a distance off, that the image of the window-shut may be distinct upon the opposite window: then computing as above, the window-shut being now the object. And for common purposes, when the focal length of a lens is but short, this length may be reckoned the distance from the lens to the place where the image of a remote object appears most distinct. For if the object be distant from the lens 100 or 1000 times the focal length, the image will be beyond the principal focus only the 100th or 1000th part of that focal length. The focal length of a lens may be found, without computation, by making the flame of a candle the object, thus: Move the lens or the candle, and the paper for receiving its image, so that, when the image is most distinct, the lens be exactly in the middle betwixt the other two; then half the distance betwixt the object or its image and the lens is the focal length required. Or if either the lens, or the candle, or the paper for receiving its image, be moved, while the other two are fixed; having measured the respective distances, the focal length may be found in the manner already stated. Or, if a small hole, of about one-fourth or one-eighth of an inch broad, be made in the window-shutter of a darkened room, and a lens and a paper be held behind this hole at proper distances; the place where the image of the hole is most distinct may be determined very accurately, and so the focal length of the lens may be found as above. Again, place the lens so that its axis may point as nearly as possible towards the sun; then holding a paper behind it, the burning point, or that in which the sun's image is smallest, and when its limb appears most distinct, is the focus of the lens. See these various methods illustrated more at large in Harris's Optics, book ii. § 4.

On the principles above illustrated is founded the structure of refracting burning-glasses, the sun's light and heat being exceedingly augmented in the focus of the lens, whether convex or plano-convex; since the rays, falling parallel to the axis of the lens, are reduced into a much narrower compass; so that it is no wonder they burn some bodies, melt others, and produce other extraordinary phenomena. See *BURNING GLASS*.

4. If a luminous body be placed in a focus behind a lens, whether plano-convex, or convex on both sides; or whether equally or unequally; the rays, after refraction, become parallel. In this case the refracted rays become the incident rays, and *vice versa*; and consequently the refracted are parallel. Hence, by means of a convex lens, or a little glass bubble full of water, a very intense light may be projected to a vast distance.

And this furnishes us with the structure of a lamp, or lantern, to project an intense light to an immense distance;

for a lens, convex on both sides, being placed opposite to a concave mirror, if in the common focus of both be placed a lighted candle, or wick, the rays reflected back from the mirror to the lens will be parallel to each other; and after refraction will converge, till they concur at the distance of the semi-diameter, after which they will again diverge. But the candle being likewise in the focus of the lens, the rays it throws on the lens will be parallel: and therefore a very intense light meeting with another equally intense, at the distance of the diameter from the lens, the light will be surprising; and though it afterwards decrease, yet the parallel and diverging rays going a long way together, it will be very great at a very great distance. Lanterns of this kind are of considerable service in the night-time to discover remote objects, and are used with success, by fowlers and fishermen, to gather their prey together, in order to take them.

If it be required to have the light, at the same time, transmitted to several places, as through several streets, &c. the number of lenses and mirrors is to be increased.

If the luminous body placed in the focus be of a larger extent, the rays, flowing from points sensibly distant from each other, cannot be parallel; but they will constitute several trains, or parcels of rays, parallel to each other.

5. The images of objects, opposed in any manner to a convex lens, are exhibited, invertedly, in its focus.

Hence, if a paper be applied to a convex lens (especially in a dark room) at the distance of its focus, the images of objects shining upon it will be represented distinctly, and in their natural colours, upon it: nor is the focus of the sun's rays any thing else, in effect, but the image of the sun. Hence in solar eclipses, the sun's image, eclipsed as it is, may be burnt by a large lens on a board, &c., and exhibit a very entertaining phenomenon.

Hence, also, if a convex lens, of any kind, be exposed both to nearer and remoter objects, and a paper at the same time be applied, so as to receive the images of objects distinctly, the distance of the focus from the lens, and thence the diameter of the convexity, may be determined. See the above.

6. If a concave mirror be so placed, as that an inverted image, formed by refraction through a lens, be found between the centre of the focus, or even beyond the centre, it will again be inverted by reflection, and so appear erect in the first case beyond the centre; and in the latter, between the centre and the focus. On these principles is constructed the *camera obscura*, which see.

7. The diameter of the image of an object delineated beyond a convex lens, is to the object itself in the ratio of the distance of the image to that of the object.

Since then the image of a remoter object is less distant from the lens than that of the nearer, the image of the more remote will be less than that of the nearer. And because the distance of the image from the lens is greater, if the lens be a segment of a greater sphere than of a less; hence the image will be greater in the former case than in the latter. The image therefore will be of such a magnitude, as it would be of, were the object to shine into a dark room through a little hole upon a wall, at the same distance from the hole at which the focus is from the lens. When an object is less distant from a lens than the focus of parallel rays, the distance of the image is greater than that of the object; otherwise the distance of the image is less than that of the object; in the former case, therefore, the image is greater than the object; in the latter less.

If the images be made greater than the objects, they will not appear distinctly; because in that case there are fewer

rays which meet after refraction in the same point; whence it happens, that rays proceeding from different points of an object terminate in the same point of an image, which is the cause of confusion. Hence it appears, that the same aperture of a lens may be admitted in every case, if we would keep off the rays which produce confusion. However, though the image is then more distinct when no rays are admitted but those near the axis, yet for want of rays the image is apt to be dim.

8. If the eye be placed in the focus of a convex lens, an object viewed through it appears erect, and enlarged in the ratio of the distance of the object from the eye, to that of the eye from the lens, if it be near; but infinitely, if remote.

The theory of real images may be thus illustrated by an experiment. Upon a long table draw the line B D (*Plate VIII. Optics, fig. 1.*) and over some point there as A, place the convex lens O, whose principal focuses are F, f; so that the axis F f of the lens be parallel to B D. In the line B D, take A E, A f, each equal to O F or O f in the axis O Q. On one side of A divide the line A B into the parts 1, 2, 3, 4, &c. each equal to A F; and on the other side take f 1 equal to A f or A F, and divide it into f' 1, f' 2, f' 3, &c. so that these parts be respectively equal to  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ , &c. of f 1 or A f. Then if the room be darkened, and a lighted candle be placed over any one of the divisions in the line A B, as at 2; the image of the candle will be seen distinct but inverted, upon a paper held over the corresponding fraction on the other side, as at  $\frac{1}{2}$ . If the candle be placed at the point 3 or 4, &c. the paper for receiving the image must be held over  $\frac{1}{3}$  or  $\frac{1}{4}$ , &c. So that if the candle be moved from 2 to an infinite distance, the whole motion of the image will be from  $\frac{1}{2}$  to f. If the candle be placed at 1, the image will be at 1, at the same distance from the lens on the other side. If the candle be brought nearer to F, the motions of the image and candle will now be reciprocal, to what they were before. But if the candle be placed any where between F and the lens, there will be no image formed.

Since an object placed at any distance, and its image, subtend equal angles at the focal centres *s, v*, of any lens; the angle under which any remote object appears being given, it will be easy to find the diameter of its image: let *q* (*fig. 2.*) be the principal focus of the convex lens O, and let the angle P s R (= *p v r*) be that under which the sun (or any other very remote object) appears to the naked eye: bisect the angle *p v r* with the line *v q*; then in the right-angled triangle *v q p* or *v q r*, we shall have the side *v q* and all the angles; whence it will be easy to find *q p* or *q r*, the semi-diameter of the image. See IMAGE and REFRACTION.

LENSES, *for concave*, their laws are as follow.—1. If parallel rays strike on a plano-convex lens K L, and F C be to F B in the ratio of refraction, the rays will diverge from the axis; and the point of divergency, or dispersion, called the *virtual focus*, will be F. See *Plate VII. Optics, fig. 3.* See FOCUS.

For the ray H I, parallel to the axis, is perpendicular to K L, and will therefore pass unrefracted to E. Wherefore F C being to F B in the ratio of refraction, F will be the virtual focus.

If then the lens be glass, F B = 2 B C; *i. e.* the virtual focus F will be distant from the lens K L by the space of the diameter 2 B C.

If the refraction be in water, F B = 3 B C; *i. e.* the virtual focus F will be distant from the lens K L a diameter and a half 3 B C.

2. If the ray  $A E$ , parallel to the axis  $F P$ , strike on a lens concave on both sides; and both  $F C$  be to  $F B$ , and  $I P$  to  $P H$  in the ratio of refraction; and  $F P : P H :: F B : B G$ ;  $G$  will be the point of dispersion, or the virtual focus. See *Plate VII. Optics, fig. 4.*

If, therefore, the ratio of the refraction be  $n : m$ ,  $C B = a$ , and  $I H = b$ ;  $F B = \frac{n a}{n - m}$ , and  $P I = \frac{n b}{n - m}$ ; consequently, disregarding the thickness of the lens,  $F P = F B + I P = \frac{n a + n b}{n - m}$ , and  $P H = P I - I H = \frac{n b}{n - m} - b = \frac{m b}{n - m}$ ; therefore,  $\frac{n \times a + b}{n - m} : \frac{m b}{n - m} :: \frac{n a}{n - m} : B G$ ; *i. e.*  $a + b : \frac{m b}{n - m} :: a : B G$ , or  $n - m \times a + b : m b :: a : B G$ ; *i. e.*  $\frac{n - m}{m} \times C B + I H : m I H :: C B : B G$ .

If, therefore, the refraction be in a glass lens, so that  $m \neq 2$ ,  $n = 3$ , and  $a + b : 2 b :: a : B G$ ; the sum of the semidiameters  $C B$  and  $I H$  will be to the diameter of the concavity of either,  $2 I H$ , as the semidiameter of the other  $C B$ , to the distance of the virtual focus from the lens,  $B G$ .

But if the semidiameters  $H I$  and  $C B$  are equal, or  $a = b$ ,  $B G = \frac{2 a^2}{2 a} = a$ ; or  $B G$ , the distance of the virtual focus from the lens, is equal to the semidiameter  $C B$  or  $H I$ . If the refraction be made in water,  $m = 3$  and  $n = 4$ , and, therefore,  $a + b : 3 b :: a : B G$ ; *i. e.* the sum of the semidiameters  $C B$  and  $H I$  will be to a diameter and a half of either concavity,  $3 H I$ , as the semidiameter of the other  $C B$  to  $B G$ , the distance of the virtual focus from the lens:

in this case, if  $a = b$ , or  $H I = C B$ ,  $B G = \frac{3 a^2}{2 a} = \frac{3}{2} a = \frac{3}{2} C B$ , *i. e.* the distance of the virtual focus from the lens  $B G$ , is to the semidiameter  $B C$  in a sesquilateral ratio.

Hence, the sun's rays striking on a concave lens, their light, after refraction, will be considerably weakened; so that the effect of concave lenses is opposite to that of the convex ones.

To find the focal length of a concave lens experimentally. Let the lens be covered with paper, having in it two small circular holes, as at  $O, v$  (*Plate VII. Optics, fig. 5.*); and on the paper for receiving the light, describe two small circles as  $a, b$ , whose centres are placed at twice the distance apart of the centres of  $O, v$ , and it will be best if their diameters are also double those of  $O, v$ . Thus, moving the paper to or fro, till the middle of the sun's light coming through the holes  $O, v$ , falls exactly on the middle of the circles  $a, b$ ; that distance of the paper from the lens will be the focal length required. For it is evident, that  $a b : O v :: a F : O F$ ; or, whatever is the distance of  $a, b$ , it will be,  $a b - O v : a O :: O v : O F$ , the focal length of the lens. Instead of the paper with the holes, small patches may be stuck on the lens.

The focus may be also found by candle-light; thus: let  $Q$  be the place of the flame;  $e, d$ , the bright spots upon the paper, and  $q$  the point where the lines  $v d, O c$ , produced, backwards, would intersect. To find the point  $q$ , it will be  $e d - O v : O v :: O c : O q$ . Then  $Q q : Q O :: Q O : Q a$ , and  $O a$  is the focal length required.

The focal length of a concave lens may be readily found by joining it to a convex one, having a shorter focus. Let  $q$  (*fig. 6.*) be the image of any object formed by the convex lens  $A$ , fixed at  $A$ ; and let  $Q$  be the image of the same object, when the concave lens  $O$  is joined to  $A$ . Having measured the distances  $Q q, q O$ , for finding the focal length of the concave lens, it will be (as before)  $Q q : Q O :: Q O : Q F$ ; then  $Q F - Q O = O F$ .

3. An object viewed through a concave lens appears erect, and diminished in a ratio compounded of the ratios of the space in the axis between the point of incidence, and the point to which an oblique ray would pass without refraction; to the space of the axis between the eye, and middle of the object; and the space in the same axis between the eye and the point of incidence, to the space between the middle of the object, and the point the oblique ray would pass to without refraction.

Though the properties of lenses have been here considered principally with regard to rays falling near the axis, and parallel to it; yet the reasoning will be easily transferred to rays remoter from the axis, and falling in any direction.— Thus we may say universally, that in a convex lens, all parallel rays become converging, and concur in a focus: that diverging rays either become less diverging, or run parallel, or converge; and that converging rays converge the more: all which alterations are more sensible in oblique rays than in perpendicular ones, because the angles of incidence in that case are greater.

In concave lenses all parallel rays become diverging, and all diverging rays diverge more; converging rays either converge less, or become parallel, or go out diverging; all which things hold of oblique as well as direct rays, but more sensibly in the first.

For the further illustration of this part of the subject of the article before us, we shall here subjoin two or three propositions; first premising, that all pencils of rays (see *PENCIL*), refracted by a lens, excepting that whose axis is perpendicular to both the surfaces, are said to be oblique, and are called "oblique pencils."

It "In every oblique pencil of rays, refracted by any lens, there is one ray whose incident and emergent parts are parallel; and this ray is the axis of that pencil, or that ray of it which undergoes the least refraction." In *Plate VII. Optics, fig. 7* to *12*, let  $R, r$ , be the centres of the spherical sides  $A, a$ ; and in *figs. 7, 8*, let  $r$  be the centre of the spherical side  $a$ . In the flattest side of any lens whatsoever assume any point  $B$ , at which let a ray of light be refracted, either at its entrance into the lens, or at its emergence out of it; draw  $R B$  perpendicular to that side, and parallel to it draw also  $r b$  perpendicular to the other side  $a$ ; join  $B b$ , then will  $B b$  be a ray, whose parts  $P B, p b$ , without the lens, will be parallel. For the ray  $B b$ , drawn between the two parallels  $R B, r b$ , is equally inclined to them both, and consequently  $P B, p b$  are also equally inclined to  $R B, r b$ , (by the law of refraction,) and therefore parallel to one another. After the same manner, wherever the point  $B$  is assumed, we can find a ray  $B b$ , that shall be equally inclined to both the surfaces; and therefore in every oblique pencil of rays there is one ray whose incident and emergent rays are parallel. It is evident also, that every other ray passing through  $B$  will be more refracted than the ray  $B b$ ; for a plane touching the lens in any other point besides  $b$  will be inclined to a plane touching it in  $B$ ; and, therefore, a ray passing through  $B$ , and any other point besides  $b$ , will be bent out of its course, more or less, according as these planes are more or less inclined. Whence the proposition is evident,  $Q q$  is the axis of an oblique pencil on the contrary side of

of the axis of the lens. Hence it appears, that the axis of any oblique pencil whatsoever is equally inclined to each side of the lens, and the less oblique is the pencil, the nearer the point B will be to the vertex A; and the less will be the distance between the parallel rays P B, *b*p.

2. In every oblique pencil of rays (figs. 7 to 12), the part B*b* of the axis within the lens, produced, if need be, will intersect the axis of the lens in the very same point O; and the point O divides the axis of the lens in such a manner, that A O : a O :: R : r; that is, 1. The point O is in the vertex of a plano-convex and plano-concave lens (figs. 7 and 8.) 2. In the double convex and double concave (figs. 9 and 10), the point O divides that part of the axis, which is within the lens, in the ratio of the radii of the sides, the shortest part being next that side which has the greatest curvity. 3. The line B*b* must be produced without a concavo convex lens (figs. 11 and 12), before it will intersect the axis; and the point O in the axis, where the said line B*b* produced intersects it, lies next to that side which has the greatest curvity; and its distance from the sides is as the radii of these sides respectively."

Let the radius of the flattest side A be called R, and the radius of the other side, r; and because the axis B*b* of any oblique pencil is equally inclined to both the sides of the lens (as we have above shewn), it necessarily follows: *Case 1.* In a plano-convex and plano-concave lens (figs. 7 and 8), the axis B*b* of any oblique pencil passes through the vertex *a*, and therefore the point O is also in *a*. For no perpendicular to the spherical side can be parallel to a perpendicular to the plane side, but that only which passes through the vertex *a*. Again, because R in this case is infinite, and O coincides with *a*; it will be R : r :: A O : a O. *Cases 2 and 3.* Because the radii R B, r*b* are parallel (by hyp.), the triangles R B O, r*b* o are similar; and, therefore, R B : r*b* :: R O : r o. Also R B ± r*b* : R B or r*b* :: R O ± r o : R O or r o. But the three first terms being invariable quantities, the 4th is so likewise; that is, in the same lens the point O is invariable. And from the position of the parallel radii R B, r*b*, it is plain that the point O must be within the double convex and double concave lens, and without the concavo-convex. Again, because R O : R A (R B) :: r o : r a (r*b*); we shall have A O (R O ∩ R A) : R A :: a O (r o ∩ r a) : r a; that is, A O : a O :: R : r; whence another part of the proposition is manifest.

Hence it follows; that the point O is in the middle of a double convex and double concave, whose sides are segments of the same sphere; and in every lens whatsoever, the greater proportion the greater radius bears to the lesser, the nearer will the point O be to the vertex *a* of that side which has the greatest curvity.

3. "If the axis B*b* (fig. 7 to 12.) of a pencil of rays is not very oblique to the axis of the lens; the points, *s*, *v*, where the parts without the lens, P B, *p*b, produced, of the axis of the oblique pencil, and the axis of the lens, divide that axis in such a manner, that A O : A s :: m : n :: a O : a v nearly." The angles, R B*s*, R B o, or their supplements, are the angles of incidence and refraction at the first side A; and therefore their sines are as *m* to *n*. In figs. 7 and 8, the angle R B*s* = A s B; and R B o = A O B. And in figs. 9 and 10, the difference between the angles, R B*s*, R B o, or their supplements, and the respective angles A s B, A O B, is equal to the angle A R B, as will appear by drawing *d*B parallel to the axis R A. And therefore the sines of these respective angles are pretty nearly in the same ratio; that is, sine < A s B : sine < A O B :: *m* : *n* nearly. But the sines of the angles, A s B,

A O B, are as the sides B O, B*s*; and when the point B is not very remote from A, B O and B*s* will be as A O and A*s* nearly; and therefore when the point B is the nearest of all to A, it will be A O : A s :: *m* : *n*. In figs. 7 and 8, the points *s*, *v*, and O, coincide; and in figs. 9 and 10, it might be proved as above, that when the point *b* is very near to *a*, it will be, a O : a v :: *m* : *n*. Hence the further the point B is from A, and *b* from *a*, the greater will be O*s* and O*v*. Let *s* and *v* be points belonging to pencils that have the least obliquity to the axis of the

lens; then will A*s* =  $\frac{n}{m}$  A O; and a v =  $\frac{n}{m}$  a O. Let the thickness, A*a*, of any lens be called *t*; then in a plano-

convex and plano-concave lens, A*s* =  $\frac{n}{m}$  *t*. And in a double convex and double concave, whose sides are segments

of the same sphere, A*s* = a v =  $\frac{n}{2m}$  *t*. Hence again, in

a plano-convex and plano-concave glass, A*s* =  $\frac{2}{3}$  *t*; and

in a double convex glass of equal convexities, and in a double concave glass of equal concavities, A*s* = a v =

$\frac{1}{3}$  *t*. It appears, moreover, that the focal length of any

lens is to be reckoned from the point *v*, if the flattest side is exposed to parallel rays; and from the point *s*, if the parallel rays are incident upon the most convex or concave side; the point *v*, in all cases, being the most remote from the flattest side, A, of the lens. The points, *s* and *v*, may occasionally be called the "focal centres" of the lens. Hence it follows, that the focal length of a convex lens is, properly, the distance between the principal focus and the next focal centre; and the focal length of a concave lens is to be reckoned from its principal focus to the farthest focal centre. As the axes of the several pencils that are not very oblique, are refracted from the same point *s* or *v* nearly; by the refraction of these axes causes no sensible confusion in the

image. Moreover, because A*s* =  $\frac{n}{m}$  A O, and a v =

$\frac{n}{m}$  a O, and because R : r :: A O : a O; it will be,

R ± r :  $\frac{R}{r}$  :: *t* (A O ± a O) :  $\frac{A O}{a O}$ ; therefore A O

=  $\frac{R t}{R \pm r}$ ; and a O =  $\frac{r t}{R \pm r}$ ; wherefore, A*s* =  $\frac{n}{m}$

×  $\frac{R t}{R \pm r}$ ; and a v =  $\frac{n}{m}$  ×  $\frac{r t}{R \pm r}$ ; and multiplying

one side of each equation by *m* ×  $\frac{R \pm r}{R \pm r}$ , it will be A*s* :

a v :: n R t : n r t.

4. "The foci of both direct and oblique pencils of parallel rays are nearly at the same distance from the focal centre (*s* or *v*, as the case is) of any lens." Let A*r*Q (Plate VIII. Optics, fig. 1 to 6.) be the axis of the lens, *r* the centre of the first surface *ab*, Q the principal focus of that surface, and F the focus of the lens. Let *p*B*B*P be the axis of any oblique pencil; and let the emergent part, B*P*, produced backwards cut the axis of the lens in *s*. Of all the rays parallel to the axis *p*B*B*P, there shall be one as D*d* which will fall perpendicular upon the first surface *a**d*; and therefore if the medium was continued, this ray (produced backwards from a concave lens, but continued through

through a convex lens) would pass through the centre  $r$ , and the geometrical focus of rays parallel to it would be at  $g$ , so that  $r q = r Q$ . This is plain, because  $d r q$  is perpendicular to the surface  $a$ , as well as  $a r Q$ . Again, of all the rays parallel to the axis  $p b$ , there shall be one as  $E e$  (if the lens is broad enough) which shall be refracted into  $e G$ , perpendicular to the second surface  $A B$ ; and therefore the focus of this ray shall be in  $s P$  produced, and in  $e G$  produced; that is, in the point of intersection  $f$ . Neglecting the aberration of the first surface  $a b$ ,  $e G$  would unite with the axis  $d r q$  in  $q$ . Hence we are to shew that  $s f = s F$  nearly.

*Cofe 1.* When one side of the lens is plain. (*Figs. 1, 2.*) Because  $s r$ ,  $f g$ , and  $s f$ ,  $r q$  are parallel;  $s f = r q = r Q = s F$ .

*Cafe 2.* When both sides of the lens are spherical. (*Fig. 3—6.*) Let  $R$  be the centre of the second surface  $A B$ , and because  $e G$  is perpendicular to this surface, it will pass through the centre  $R$ . And because  $r q$  is parallel to  $s f$ , it will be  $R r : R s :: r q : s f$ . The two first terms,  $R r$ ,  $R s$ , being invariable quantities, and  $r q$  being allowed to remain invariable,  $s f$  will also be invariable; that is,  $s F$  will describe the sector  $s F f$ , and  $s f = s F$ . But because of the aberration by the first surface  $d e$ , no ray, as  $E e$ , parallel to and remote from the axis  $D r q$ , can be refracted to the focus  $g$ ; but it will cut the axis  $r q$  in some point  $y$  between  $q$  and  $r$  (*fig. 1 to 6.*); and therefore a ray parallel to  $p b$ , that shall be refracted perpendicularly to the second surface  $A B$ , must be some ray  $b k$  between  $E e$  and the axis  $p b$ , if the centres,  $R, r$ , are on different sides (*figs. 3 and 4.*); otherwise  $b k$  will be farther from the axis than  $E e$  (*figs. 5 and 6.*); and consequently this ray will cut the axis  $s f$  in some point  $a$ , between  $f$  and  $s$ . But it has been already shewn, that if the lens had no aberration,  $f$  would be the focus of all the rays parallel to the axis  $p b B f$ ; and as the aberrations at the different surfaces are contrary, it is sufficiently evident that the focus of those rays which are nearest to the axis  $p b B f$ , will not be remote from  $f$ .

In every lens whatsoever, the true focus  $g$  of an oblique pencil of parallel rays is between  $f$  and  $s$ ; that is,  $s g$  will be less than  $s f$  or  $s F$ . Because if there was no aberration at either surface of the lens,  $s g$  would be equal to  $r F$  or  $s f$ ; and therefore it must follow, that if the aberrations at each surface were equal, they would destroy each other. (*Figs. 3, 4.*) Let rays of light be within the lens, on each side of the axis  $b B$ , and let their inclination to that axis be such, as that they would emerge at the side  $b$ , parallel to  $b p$ . It is plain, that a ray parallel to the oblique axis  $p b B P$ , and between the said axis and the perpendicular  $d r$ , will be more oblique to the emergent side  $A$  than to the incident side  $a$ ; and therefore, in this case, the aberration at the side  $A$  is the greatest, and this excess of the aberration contracts the focus nearer to  $s$  than  $f$ , as to  $g$ . In like manner, if the parallel ray be on the other side of the oblique axis, the greatest aberration will be on the incident side  $a$ ; and in the present case likewise, this excess of aberration contracts the focus nearer to the lens, as to  $g$ ; and it is plain, that the more oblique is the pencil, the greater will be  $f g$ ; whence the proposition is manifest.

5. "The focus of incident rays, either diverging or converging upon any lens, being given: to find the focus of the emergent rays." Let  $F f$  (*Plate VIII. Optics, fig. 7 to 12.*) be the axis of any lens  $B b$ , whose focal centres are  $s, v$ ; and principal foci are  $F, f$ . Let any point  $Q$  in the axis of the lens be the focus of incident rays, either diverging as  $Q B$ , or converging as  $M B$ ; and let  $f$  be the geo-

metrical focus of those rays parallel to the axis of the lens, whose incidence is on the same side with the ray  $Q B$ , or  $M B$ . To find the focus of the emergent rays, say  $Q F : F s :: v f (F s) : f g$ ; and placing  $g$  the same way from  $f$  that  $F$  is from  $Q$ , the point  $g$  thus found will be the focus required. Let the point of incidence  $B$  be not remote from the vertex of the lens; from the centre  $v$  describe the arc  $f d$ , and draw  $v d$  parallel to the incident ray  $Q B$ , or  $M B$ ; then will  $d$  be the point where the emergent ray intersects the axis  $v d$ ; and therefore the point  $g$ , where the emergent ray  $b d$  (or  $N b$ ) produced, intersects the axis of the lens, is the focus required. Again, draw  $s D$  parallel to  $g B$ ; then will the triangles,  $Q D s$ ,  $v d g$ , be equiangular, and therefore  $Q D : D s :: v d : d g$ . But  $D$  is a point where the incident ray  $Q b$ , or  $N b$ , after refraction by the lens, will intersect the axis  $s D$ , so that  $s D = s F$  nearly; and when the triangles,  $Q D s$ ,  $v d g$ , are vanishing, the point  $D$  will coincide with  $F$ , and  $d$  with  $f$ ; wherefore  $Q F : F s :: v f : f g$ . Hence it follows, 1. Because  $F s = v f$ ,  $F s$  or  $v f$  is a mean proportional between  $Q F$  and  $f g$ ; that is,  $Q F : F s :: F s : f g$ . 2.  $Q F : F s :: (v f : f g ::) Q s (Q F \div F s) : v g (v f \div f g)$ . 3.  $Q F : Q s :: (F s : v g ::) Q s (Q F \div F s) : Q s \div v g$ . Obf. When the

lens is not very thick in proportion to its focal length, the focal distances,  $S F$ ,  $v f$ , may, without sensible error, be reckoned from the point  $O$ , which bifects  $v s$ ; and then the preceding proportions will be convertible into the following: *viz.*  $Q F : F O :: F O (= O f) : f g$ ; and  $Q F : F O :: Q O : O g$ ; and  $Q F : Q O :: Q O : Q g$ . 4. If  $g$  be the focus of incident rays,  $Q$  will be the focus of the emergent rays. 5. The focuses,  $Q, g$ , move both the same way, and always lie contrary to  $F$  and  $f$ . And the distances,  $F Q, f g$ , vary reciprocally; that is, as one increases, the other decreases, but with a different velocity, according as they are differently situated. When  $Q$  coincides with  $F, g$  will be at an infinite distance; that is, the refracted rays will emerge parallel to the axis. And in *figs. 7, 8*, when  $Q O = 2 O F$ ,  $O g$  will be  $= O Q$ ; whence the difference of the focal distances of the refracted rays, when  $Q O = 2 O F$ , and when  $O$  is infinite, is only equal to  $O f$ . 6. When the focus  $Q$  of rays diverging upon a convex lens (*fig. 9.*) lies between  $A$  and the lens, the refracted rays ( $b N$  instead of crossing the axis) will diverge from the focus  $g$ . And if incident rays upon a concave lens converge towards the point that is nearer to it than  $F$  (as in *fig. 10.*), the lens in this case will have a real focus; that is, the refracted rays will cross the axis in  $g$ . And universally, 7. When the focuses,  $Q, g$ , lie both on the same side of the lens; if the incident rays diverge from  $Q$  (*fig. 9—12.*), the emergent rays will diverge from  $g$ . And if the incident rays emerge towards  $Q$  (*fig. 10, 11.*), the emergent rays will converge towards  $g$ . And in all these cases, the nearer  $Q$  is to  $O$ , the nearer also will  $g$  be to  $O$ ; and if one of these focuses be in  $O$ , the other also will coincide with it. And the contrary happens, when  $Q$  and  $g$  are on different sides of the lens; that is, rays diverging from  $Q$  (*fig. 7.*) will converge towards  $g$ ; and rays converging towards  $Q$  (*fig. 8.*) will diverge from  $g$ .

We have hitherto taken notice of the progress of a single pencil of rays, or such as come from a single point, through a lens; but it is easy to apply the same kind of reasoning to the various points of an object. Let  $D E$  (*Plate VII. Optics fig. 13.*) be an object,  $A B$  a double convex lens, whose centre is  $C$ ; and let us examine the pencils of rays which come from three points only of the object, since the situation

situation of the intermediate pencils; is evidently comprehended between those three. Of all the rays which proceed from each of these points, that which passes through the centre C of the lens must proceed, if the lens is not remarkably thick, in a straight line, so that DCI, FCH, and ECG, are straight lines; secondly, the focus of the rays DBA, after refraction, must be somewhere in the axis or straight line DCI; also that of the middle pencil, FBA, must be somewhere in FCH, and the focus of the third pencil must be in ECG. Thirdly, the refracted focus of each pencil must be on the contrary side of the axis of the lens, to what its incident or radiant focus is; for instance, the refracted focus I is below the axis of the lens, whilst its incident or radiant focus D is above it; and the refracted focus G is above the axis, whilst its radiant point E is below it: the consequence of which is, that if the object DE be sufficiently luminous, and a piece of white paper, or other flat and opaque body, be situated at GI, an image of the object DE will be formed upon it, but in an inverted position. If the opaque body be removed, then no image will be seen by a spectator situated on one side; for the rays of light, though they meet at their respective foci in IHG, yet they proceed divergingly beyond that place through the air or other transparent body, and none come to the lateral spectator. If the paper be situated nearer or farther from the lens than the place GI, then an imperfect image, or no image at all, will be formed upon it, because the rays of the respective pencils do not meet at any other place.

From what has been said above with respect to the conjugate foci of the same pencil, it will be clearly deduced, that if the object DE be brought nearer to the lens, the refracted foci, or the image GHI, will be formed farther from the lens, and *vice versa*. And from this it follows, that (since the angles DCE, GCI, formed at the centre of the lens by the axes of the two extreme pencils, are equal) when the distance of the object from the lens is equal to that of the image from the lens, then the size of the image is equal to that of the object; when the former distance is less than that of the latter, then the image is larger than the object; and when the former distance is longer than the latter, then the image is smaller than the object.

With respect to the brightness of that image it must be considered, that of the innumerable rays which are incessantly emitted in every direction from each point, for instance D, of the object, a considerable number, *viz.* DAB, fall upon the lens, and are converged to a single point I; therefore that point must be more or less bright in proportion as the surface of the lens is larger or smaller. Hence also a very remarkable property of those lenses is easily comprehended, which is, that when an image GHI is thus formed, if you cover part of the lens, be it the middlemost or some lateral part of it, the image IG will not thereby be rendered partly invisible,—the whole image will be seen as well as before, but it will appear less bright than before; for if we consider each indefinite part of the lens, we may easily perceive that rays of light from every point of the object must pass through that part, and must meet at the respective foci in GHI.

The above explanation of the progress of various pencils through a convex lens, may, *mutatis mutandis*, without much difficulty be adapted to explain the action of concave lenses. Newton's Optics. Smith's Optics. Harris's Optics. Cavallo's Philosophy, vol. iii.

LENS, or *Lenticula*, was the name of a kind of weight

among the Romans; being the hundred and eighth part of a drachm; equal to a grain and a half.

LENS, in *Anatomy*, a transparent body, nearly spherical in figure, placed in a depression in front of the vitreous humour of the eye. It is generally mentioned with the epithet crystalline. See EYE.

LENS, in *Botany*, the Lentil, *Ervum Lens* of Linnæus, but in reality a species of *Cicer*; see Sm. Fl. Brit. 776, and our article ERVUM. The Latin word lens is said to have originated from *lens*, mild, because those who fed on this sort of pulse were supposed to become mild and gentle in disposition.

LENS, *Palustris*. See DUCK'S MEAT.

LENS, in *Geography*, a town of France, in the department of Jennepe, and chief place of a canton, in the district of Mons. The place contains 1229, and the canton 13,714 inhabitants; on a territory of 237½ kilometres, in 19 communes.—Also, a town of France, in the department of the straits of Calais, and chief place of a canton, in the district of Bethune; seven miles N.W. of Douay. The place contains 2325, and the canton 13,246 inhabitants, on a territory of 152½ kilometres, in 21 communes.

LENSWYCK, a town of Norway; 20 miles W.N.W. of Dronthek.

LENT, QUADRAGESIMA, a time of mortification, during the space of forty days, wherein Christians are enjoined to fast, in commemoration of our Saviour's miraculous fasting so long in the desert, and by way of preparation for the feast of Easter.

In the ancient Latin church, Lent only consisted of thirty-six days. In the ninth century, to come somewhat nearer to the miracle, several took upon them to add four days more; which in time became a general practice: though the church of Milan is said still to take up with the ancient thirty-six.

According to St. Jerom, St. Leo, St. Augustine, and others, Lent must have been instituted by the apostles. Their way of reasoning is thus: whatever is generally received throughout the whole church, and whose institution we do not find in any council, must be esteemed to have been established by the apostles. Now such, they say, is the fast of Lent. Its institution is not spoken of in any council; but many of the ancient councils, particularly that of Nice, that of Laodicea, &c. and some of the oldest fathers, particularly Tertullian, speak of it as a thing of some standing.

The reformed, generally, hold Lent to be a superstitious institution, set on foot by some vain enthusiasts, who durst undertake to ape the miracles of Jesus Christ; as, in effect, it appears to have been from a passage of Irenæus quoted by Eusebius.

Some will have it to have been first instituted by pope Telephorus, in the second century: others, who own that there was a kind of abstinence observed in the ancient church before Easter, yet contend that it was entirely voluntary, and was never enjoined by any law till the third century. See FAST.

This religious season is said to have been first observed in England by our Saxon ancestors in the year 640. Anderson's Hist. of Commerce, vol. i. p. 25.

Political Lents have been often enjoined by statute and royal proclamation. See ABSTINENCE.

King James I. issued a proclamation against eating flesh in Lent in 1619, and another in 1625. A similar proclamation was also issued by Charles I. in 1627, and another in 1631.

There was some difference between the practice of the Greek

Greek and Latin churches, as to the business of Lent; the Greeks beginning it a week sooner, but at the same time allowing more days of intermission than the Latins: those who held it seven weeks did not fast on Saturdays, as those who observed but six did.

The ancient Latin monks had three Lents; the grand Lent before Easter, another before Christmas, called the Lent of St. Martin; and a third after Whit Sunday, called the Lent of St. John Baptist; each of which consisted of forty days.

The Greeks, besides that before Easter, observed four others; that of the Apostles, of the Assumption, of Christmas, and of the Transfiguration; but they reduced each of them to the space of seven days. The Jacobites added a fifth, which they called the Repentance of Nineveh; and the Maronites a sixth, called the Exaltation of the Holy Cross. By the ninth canon of the eighth council of Toledo, it is ordained, "That if any person, without evident necessity, eat flesh in Lent, they shall be deprived the use of it all the rest of the year."

By the fifth chapter of the fourteenth session of the council of Trent, confession is enjoined as peculiarly fit and acceptable at this season. Hard. Conc. tom. x. p. 93.

The forty days in Lent, say some, are observed in remembrance of the forty days wherein the world was drowned; or, as others say, of the forty years wherein the Jews wandered in the desert; others of the forty days allowed Nineveh for repentance; others of the forty stripes by which malefactors were to be corrected; or, the forty days during which Moses fasted at the receiving of the law; or the forty days fast of Elias; or finally, the forty days fast of our Saviour.

**LENTAGO**, in *Botany*, a name adopted by Cæsalpinus, (de Plantis, 76,) for the Laurustinus, *Viburnum Tinus* of Linnæus, and said to be of Tuscan origin. Linnæus has applied it to an American species of *Viburnum*.

**LENTELLA**, in *Geography*, a town of Naples, in Abruzzo Citra; 18 miles N.E. of Civita Borella.

**LENTEMENT**, *Fr.* in *Music*. This word is equivalent to *largo* in Ital., and implies a slow movement. Its superlative, *treslément*, very slow, is the slowest of all movements.

**LENTE**, in *Geography*, a town of Norway; 20 miles N. of Berga.

**LENTE** LAPIDÆÆ, *fossile lentis*, in *Natural History*, the name given by many writers to a very remarkable fossile substance, usually found immersed in hard stones, and of a roundish but flattened shape, resembling not unaptly a pea or lentil flattened by pressure. They generally lie in great quantities in the same mass of stone; and are of very different appearance when their sides or ends are seen, from that which they exhibit when their flat surfaces come in view.

They are generally supposed to be lentils petrified and bedded in stone, and as their sides come in view in some parts of the masses, they are not perceived to be a part of the same substance, but are called the remains of seeds of other plants, and the whole stone is usually named *lapis frumentarius*.

We are not to suppose, that so soft a body as the lentil seed, or a common pea, could be easily petrified and preserved in its own form in stone; since if these soft substances were readily capable of such a change, they are so very common in their recent state, that they must be expected to be found in this fossile condition very frequently also, and in great variety. This, however, is not the case. But this improbability is not all the reason we have to conjecture, that these are not what they are vulgarly supposed to be,

that is, fossile seeds; for a stricter examination of the things themselves proves this to be, impossible. Seeds, and other such things, are of some determinate growth; the size of which we know, and are well acquainted with their internal structure, which is only a farinaceous matter contained in a thick superficial skin or covering.

On the contrary, these fossils, when examined, prove to be of various sizes, from the minutest speck visible to the eye, to near an inch in diameter, a size that no lentil could be supposed to arrive at. They are of two kinds; the one convex on both sides, the other convex on one side only, and plane on the other. The first are thickest in the middle, and gradually lessen in thickness all round, till they terminate in a thin edge; the others are just like the halves of these when split horizontally. Those which are convex on both sides, have usually several crooked lines, rising from the umbilicus on each side, and tending towards the circumference; and the flat ones have usually on the flattened side a number of concentric circles surrounding the umbilicus, and one another to the edge. When these are broken, they are found to consist of a number of cases, or coats, one within another, all of the same shape with the outer one; and some of them are striated, or made up of transverse fibres. They are plainly of animal origin, though they differ from all the parts of animals hitherto known. Woodward's Cat. of Fossils. vol. ii.

Dr. Woodward, in one place, supposes them to have been the loose bones which are found in the heads of some fishes, and are supposed to serve for hearing; but that they belong to some fish at present unknown, or that has not been yet examined in this particular: there is, however, another much more probable opinion, which he mentions afterwards, that they may have been opercula of shell-fishes, of the nature of the umbilicus Veneris, of which the fishes we know afford us a great variety; and the many others we are yet unacquainted with, may furnish numbers of other kinds very different from all we do know.

These bodies are found in a hard greyish stone, and some of the large ones, which are flattened on one side, give great reason to judge that they are of this origin, as some of the large ones have on the flat side a reddish line, beginning at the centre, and thence continuing in a spiral form for eleven or twelve turns, till it reaches the edge of the stone. This is exactly the formation and lineation of the common umbilicus Veneris, only that it has fewer spires. The stone, called by authors *lapis numminalis*, is generally allowed to be of the nature of these opercula, and this differs very little from these large *lentes lapidææ*, as they are called.

**LENTHALL**, WILLIAM, in *Biography*, an English lawyer, and famous as a speaker in the Long Parliament, was born at Henley on Thames, in Oxfordshire, in 1591, and educated at Alban-hall, Oxford, from whence he removed to Lincoln's Inn, where he was called to the bar. In 1639 he was elected into parliament for Woodstock, and in 1640 was chosen speaker, in which capacity he was said to have made a considerable fortune by joining the ruling party. He was also master of the rolls, a commissioner of the great seal, and chancellor of the duchy of Lancaster. He was turned out by Cromwell in 1653, but in the following year he became speaker of the parliament called by the protector. At the restoration he was exempted from the act of indemnity, but obtained a pardon from the king. He died, it has been asserted, expressing great penitence for the part which he had borne in the rebellion, in 1662. Several of his speeches and letters have been printed.

**LENTIBULARIA**, in *Botany*. See **URICULARIA**.

**LENTICULA**, so called from the convex figure of its

little round leaves, which resembles that of the *Lens*, or Lentil seed. See LEMNA.

LENTICULA. See PETECHIA.

LENTICULAR SCALPEL, from *lenticulaire*, doubly convex, in *Surgery*, denotes an instrument usually placed among those which are considered necessary in the operation of the trepan. Its particular use is to cut off the irregularities which often present themselves at the edge of the perforation made with the trephine, and which might, if unremoved, cause irritation and injury of the dura mater. The shape of the instrument can hardly be conceived without ocular examination, or, at least, a reference to an engraving. (See the *Plate of Trepanning Instruments*.) We can only state, that one side of its blade is convex, the other concave, and one of its edges sharp. On the end of the blade is fixed a little shallow cup, with its concavity towards the handle of the instrument. This small cup-like part serves the purposes of receiving the little pieces of bone when detached, keeping the end of the blade from hurting the dura mater, and when applied under the margin of the perforation in the cranium, enables the operator to guide the instrument all round with steadiness and security. Dict. of Practical Surgery.

LENTICULARE, GANGLION, in *Anatomy*, a small ganglion in the orbit, from which the nerves of the iris are produced. See NERVE.

LENTICULARE OS, is a small round bone of the carpus, oftener described under the term pisiforme. See EXTREMITIES.

LENTICULARIA, in *Botany*. See LEMNA.

LENTIGO. See FRECKLES.

LENTIGO is also used by Dr. Quincy for a brown, scaly, or scurfy eruption upon the skin; such, especially, as is common to women in the time of child-bearing.

LENTIL, LENS, in *Botany*, a species of *Ervum*; which see.

Lentils are the best as well as cheapest food for pigeons.

The seeds of lentils are frequently the common food of the poor in some of the islands of the Archipelago, and other warm countries, when they can meet with no better fare. Another sort of lentil has of late years been cultivated in England, under the name of French lentil. This is the *lens major* of Caspar Bauhine; and being twice the size of the common lentil, is by so much the better worth cultivating. This is called *hills* in many parts of England. Miller's Gard. Dict.

The ancients affirm, that lentils, eaten with their skins on, bind the body, and stop a looseness; and yet at the same time, that the liquor they are boiled in loosens the belly. They are but rarely used in physic, though the flour of them may be used outwardly in cataplasms, for the same purposes as bean-flour.

LENTIL, in *Agriculture*, the name of a plant of the vetch or tare kind, which is cultivated in some places as fodder for cattle. Lentils grow a foot and a half in height, with stalks and leaves like those of tares, but smaller; and, like them, they bear their seeds generally three or four in little pods. These seeds are round, hard, smooth, and flat, but thicker at the sides. There are two sorts of lentils, the white and the yellow; but the latter affords the greater quantity of fodder. The seeds of this plant are commonly sown in March, where the land is dry; but in moist ground, April is a better season. The usual quantity of seed allowed to an acre of land is from one bushel and a half to two bushels. If these are sown in drills in the same manner as peas; they are said by some to succeed better than when they are sown broad-cast. The drills should be a foot and a

half asunder, to allow room for the hoe to clean the ground between; or if weeds are permitted to grow among them, they are apt to get above the lentils, and prevent them from being properly supported.

This is a crop not uncommon about Chesterford, in Essex, where they sow a bushel an acre on one ploughing in the beginning or middle of March. "It is there the custom," Mr. Young says, "to make hay of them, or feed them, for cutting into chaff for trough-meat for sheep and horses, and they sow them on both heavy and dry soils." It is added, that the whole country is of a calcareous nature; and likewise that attention should be paid not to water horses soon after eating this sort of food, as they are apt to have them. They are likewise asserted to be cultivated for the same purpose in Oxfordshire, and probably in other districts.

LENTILIUS. See LINSENBAUR.

LENTINI, in *Geography*, anciently *Leontini* or *Leontium*, which was a spacious, rich, and celebrated city of Sicily, and the rival of Syracuse, is now reduced to a population of 4000 persons, who occupy a very inconsiderable portion of the ruins of ancient Leontium. It is situated in Noto, on a river of the same name, about five miles from the sea. The air of the adjacent country, which abounds in marshes, is so insalubrious, that it prevents the increase of inhabitants, notwithstanding the fertility of the soil and the variety of its productions. Three miles from Lentini is a large lake, estimated at about 20 miles in compass, called "Bivieri," or the lake of Lentini, belonging to the prince de Butera, which produces 1500l. a-year; for the lease of the fishery, consisting of eels, tench, and cefaul, or a sort of barbel, that feeds in either fresh or salt water. The vicinity also yields great plenty and variety of game; 19 miles N.N.W. of Syracuse. N. lat. 37° 18'. E. long. 15°.

LENTISCASA, a town of Naples, in Principato Citra; nine miles S.W. of Policastro.

LENTISCUS, in *Botany*, the Mastic tree, supposed to have derived its name from *lentus*, and *lentisco*, alluding to the pliability and tenacity of its gum or resin. See PISTACIA.

LENTISK. See PISTACIA and MASTIC.

LENTISK, *African* and *Peruvian*, or *Indian MASTIC*. See SCHINUS.

LENTO, *Ital.*, a musical term for slow, or a movement between largo and grave:

LENTO, in *Geography*, a town of the island of Corfica; 11 miles S. of Oletta.

LENTON, JOHN, in *Biography*, a musician in the band of king William and queen Mary, whose instrument was the common flute. He composed and published, in conjunction with Tollet, a work entitled "A Conforte of Musick, in three parts," probably two flutes and a base-viol or arch-lute. At the beginning of the last century, the flute à bec, or common flute, was in much higher favour than the violin, or German flute, which was then hardly known in this country. There are catches of Lenton's composition printed in "The Pleasant Musical Companion."

LENTOR, in *Medicine*, a term employed by Boerhaave and his followers, to denote a supposed glutinous or viscid condition of the fluids of the living body, to which they ascribed the origin of many diseases.

It is scarcely necessary to enter at any length into the detail or refutation of an hypothesis, which was founded at the best upon a gratuitous and mistaken view of the operations of the animal economy, and which a better pathology has long ago exploded. Boerhaave, in his observations on diseases arising from a *spontaneous gluten*, (see his Aphorisms, § 69, et seq. and the commentary upon them in his "Praxis Medica,")

dica,") considers the direct effect of it to be an obstruction to the free circulation of the blood, especially through the small ramifications of the vessels. "Hence all the concoctions, circulations, secretions, excretions, all the vital, natural, and animal motions are disordered; whence arise suffocation and death." (3 pb. § 73.) Under this head, then, he readily includes not only inflammations, tumours, and concretions, but almost every species of chronic disease, especially where there is any change either in the qualities of the secretions, as the saliva, urine, &c. in the colour and complexion, as in chlorosis, leucophlegmatia, jaundice, &c.: or where any part, either external or internal, is altered in its form; as in all eruptive or cutaneous complaints, in scrofula, cancer, scirrhus, meliceris, or other species of swelling. But in all these instances, the asserted presence of a *gluten* or *lentos* is gratuitous; there is no evidence of any such change in the property of the circulating blood; and the morbid humour, where any such palpably exists, is found out of the course of the circulation, and is, in all probability, the result of a deranged action of the vessels in the part where it is found. Thus, in an abscess, following a phlegmous inflammation, (as in a common boil,) it is clear that there is no such thing as a purulent *lentos* in the mass of the blood; the pus is generated in the inflamed part, by an operation of the vessels, analogous to the secretion of bile or saliva, and is a new product, not a pre-existing matter. The argument, deduced from the appearance of the *buffy crust* on blood, drawn during the existence of inflammatory fever, is altogether fallacious; as this *buff* is but the ordinary coagulable lymph of the blood, somewhat more separated from the red globules. See BLOOD, and HUMORAL Pathology.

LENTZ, in *Geography*, a town of Prussia, in the territory of Ermeland; eight miles N.E. of Elbing.

LENTZBURG, an extensive bailiwick of Switzerland, in the canton of Berne, which was formerly a rich and powerful country. Its capital, of the same name, is one of the four municipal towns of the Aryan, having a considerable trade, and manufactures of flowered linens and cotton, tobacco, &c.; 16 miles W. of Zurich.

LENTZEN, a town of Brandenburg, in the mark of Prenzitz, near the Elbe; 74 miles N.W. of Berlin. N. lat. 53° 9'. E. long. 11° 36'.

LENZA, a small island in the Adriatic. N. lat. 44° 5'. E. long. 15° 31'.

LEO, LION, in *Astronomy*, the fifth of the twelve signs of the zodiac.

The stars in the constellation Leo in Ptolemy's Catalogue are 27, besides the inermes, which are eight; in Tycho's 30, in the Britannic Catalogue 95. See CONSTELLATION.

LEO I., in *Biography*, emperor of the East, succeeded Marcian, in the year 457, through the favour and interest of the patrician Aspar, who, on account of his Arian principles, was excluded from the empire. Leo was a native of Thrace, who had gradually risen in the Roman armies to the rank of military tribune, and was principal steward of Aspar's household. He received the imperial crown from the hands of the patriarch of Constantinople, which is the first instance of an ecclesiastical being employed in that ceremonial. Under Genferic the Vandals planted themselves in Africa, and Aspar favoured their cause. Leo became jealous of the influence and power of Aspar, and in the end caused him and his son to be put to death without the form of a trial, upon the mere charge of a conspiracy. The remaining parts of his family and friends attempted to revenge this treachery, and the Goths, attached to them, committed great disorders in Constantinople, which were suppressed by Zeno. The Arians, having lost their patron, were treated

with great rigour by Leo. From the Goths he was obliged to purchase a peace, which he did not long survive. He died in January 474, after a reign of nearly seventeen years. His moderation and love of justice have been praised, and several of his laws remain in the code of Justinian.

LEO III., surnamed the *Isaurian*, from Isauria, the place of his birth, was born of low and obscure parents. He entered the army, and became a guard to Justinian II. He attained the rank of general under Anastasius II. who took him in 717 as a coadjutor in the empire. The Saracens having ravaged Thrace, laid siege to Constantinople, which was bravely defended by Leo, who compelled them to retire. His reign was marked with acts of atrocious tyranny; he drove the patriarch Germanus from his place, and gave it to Anastasius. In the fifth year of his reign, he caused his son Constantine, surnamed Copronymus, to be solemnly crowned. In 726 he made his famous attack on image worship, which has rendered his reign memorable in ecclesiastical history. The destruction of objects long so much venerated, and especially of a statue of Jesus Christ placed over one of the gates of the city, struck the people with so much horror, that a serious insurrection was the consequence. Leo had authority sufficient to enforce his reform in the eastern empire, but in the West it encountered a more formidable opposition. Pope Gregory II. declared with great warmth against the imperial edict, and the people of Italy openly revolted. Leo sent a fleet to chastise the revolters, which was wrecked in the Adriatic, a circumstance that was interpreted as a divine interposition. The emperor, irritated by his want of success, inflicted great cruelties on the opposite party; the Saracens took advantage of these dissensions to make incursions into the bordering provinces. A dreadful earthquake added to the calamities of this reign. Leo died in 741, after a reign of twenty-four years.

LEO IV., the son of Constantine Copronymus, succeeded his father in 775, at the age of 25. The first object of his reign was to secure the succession of his son Constantine, whom he had by Irene, an Athenian lady of great accomplishments. He caused the youth to be solemnly crowned, and declared a partner in the empire. Leo IV. inherited his predecessor's enmity to images, and is on that account reckoned, by the Catholics, one of the impious "iconoclasts." He obtained some advantages over the Saracens, and initiated into the Christian religion a king of the Bulgarians, who, in the preceding reign, had inflicted great evils on the empire. He died in 780, and his death was imputed to an eruption on his head, which was said to have been excited by a crown that he wore, and which was studded with jewels, that he had sacrilegiously taken from the great church of Constantinople.

LEO V., the Armenian, son of a patrician, commanded an army against the Saracens in the reign of Michael I. His success, contrasted with the disgrace incurred by the emperor himself, caused a revolt of the army, and Michael himself quitted the throne, to which Leo succeeded, without opposition, in the year 813. He had been educated in the camp, and was ignorant of laws and letters; his administration, therefore, partook of severity and military discipline. In religion he followed the steps of the iconoclasts, and drew upon himself an excommunication from pope Paschal I. He attempted a reformation in the abuses of government, by which he made himself many enemies. At the head of these was Michael, formerly his fellow commander in the army, and a principal instrument of his elevation. Though he had been enriched and promoted by Leo, he was dissatisfied with his reward, and formed a conspiracy

spiracy against him. This was detected, and Michael was arrested, and condemned to die on Christmas day, but the holiness of the season caused a reprieve of the execution. In the interval, the friends of Michael assembled, and mingling with those who came to perform divine service in the imperial chapel, concealed themselves till the entrance of Leo. A signal was given, and an attack was made, by mistake, on the priest who led the devotions; perceiving their error, they instantly turned their fury upon the emperor, who had retired to the altar, and disregarding the cross which he held, they cruelly assassinated him. This event took place in 820, after Leo had reigned with reputation seven years and a half.

LEO VI., the philosopher, was the son and successor of Basil, the Macedonian, who had caused him to be crowned as his partner in the empire in 870. By the treachery of a monk he had nearly lost his eyes and his inheritance, but his friends zealously exerted themselves to procure his release, and restoration to favour. On the death of Basil in 886, Leo succeeded to the imperial throne, having a nominal partner in his brother Alexander, but he himself possessed the sovereign power. The Bulgarians, in this reign, renewed their usual hostilities against the eastern empire; and the ill success of the generals of the emperor, obliged him to submit to such terms of peace as they were pleased to impose. With the Saracens likewise several actions were fought by sea and land with various success. But he was chiefly harassed by conspiracies at home, and had more than once nearly lost his life. By his literary reputation he acquired the title of "philosopher," but his private conduct displayed an indolent and voluptuous character. He had in his theological zeal prohibited third marriages, whereas having himself lost three wives, he entered into the holy state a fourth time, which led to his excommunication. It has been urged, in excuse of his conduct, that he had no remaining issue by the first three marriages. He was, during his whole reign, much under the dominion of favourites; he was superstitious, and made pretensions to the art of foretelling future events by divination. A defeat of his fleet by the Saracens preceded his death, which happened in 911, after he had been on the throne twenty-five years. He bequeathed the empire to his brother Alexander, as a trust for his son. Leo had been educated under the learned Photius, from whom he derived an attachment to various kinds of erudition. He was supposed by some to have been the author of a collection of sermons or homilies; of a letter to the caliph Omar on the truth of the Christian religion; of a pastoral letter to his subjects; of a treatise on military discipline, and a collection of laws begun by his father. For farther particulars relating to the foregoing emperors, see Gibbon's Hist. and Univer. Hist.

LEO I. pope, surnamed "The Great," was a native either of Tuscany or Rome; at the latter place he was educated. Nothing certain is known of him till he was raised to the dignity of archdeacon of the Roman church under the pontificate of pope Celestine. He occupied the same post under Sixtus III. and acquired a very high reputation for piety, orthodoxy, eloquence, and prudence, in the management of business. He was employed to negotiate certain differences which had arisen in Gaul, between Aetius and Albinus, and succeeded in the object of his mission. While he was in Gaul, Sixtus III. died in 440, upon which the universal voice of the Romans proclaimed Leo his successor, and upon his return he was received with the greatest demonstrations of joy. He commenced his pontificate with the most zealous exertions of a Christian bishop, and he was particularly anxious for the advancement and grandeur of

the papal see. In the year 442, he extended the law of celibacy to the archdeacons, who nevertheless were not to abandon the wives whom they had married, while in inferior stations, but were in future to live with them as sisters. In the year 445, he quarrelled with Hilary, bishop of Arles, for opposing the power of the papal see, and obtained an edict from the emperor Valentinian, which put an end to the ancient liberties of the Gallican churches, and enforced those appeals to Rome which gradually subjected all the western churches to the jurisdiction of the pretended successors of St. Peter. About this time many of the Manicheans flying from Africa, after the conquest of Carthage by Geneseric, king of the Vandals, had repaired to Rome as a place of safety. The zeal of Leo would not suffer them long to enjoy tranquillity, but caused great numbers of them to be seized and imprisoned. Those who abjured their distinguishing tenets were admitted into communion, but those who steadily adhered to their principles were condemned to perpetual banishment. The pope found that many of the Manicheans had made their escape from Rome; he accordingly sent a circular letter to all bishops, exhorting them to be upon their guard against the said heretics, and when discovered, to prosecute them without mercy. His holiness was not contented with what he could do by the power with which he himself was armed, but he applied to the emperor Valentinian, for a law to exclude such persons from all civil and military employments, and to declare them incapable of giving or receiving any property by will or testament, or of making any contract. Leo was equally violent against the Priscillians, who pretended to high degrees of purity of life and manners, who practised great mortifications, and whose opinions were a compound of Gnosticism and Unitarianism. For propagating them, their leader, Priscillian, had been put to death, and was accordingly regarded as a saint and martyr. Leo now condemned the doctrines and practice of his followers as impious and detestable, and declared all those who tolerated heretics, no less guilty than those who embraced their opinions. The doctrine of Eutyches, which maintained that there was but one nature in Christ, roused the zeal of Leo, and after much discussion, concerning which our limits do not allow us to enlarge, he caused the heretic to be condemned, sent into banishment, and deprived of his sacerdotal dignity; and a decree was passed, that "in Christ there were two distinct natures united in one person, and that without any change, mixture, or confusion." During the pontificate of Leo the fourth general council was held, in which the famous canon was enacted, which rendered the see of Constantinople equal to the see of Rome in all respects, except precedence. This canon was evidently intended to check the growing power, and to oppose the daily encroachments of the bishop of Rome. When Leo was made acquainted with the determination of the council, he was filled with the utmost rage, and resolved to oppose it with all his might. He saw his rival but one step behind him, and was apprehensive he might soon get before him; he was, therefore, determined to dispute his power in every stage. Wishing, however, that he might be thought to be acting upon Christian motives, he pretended to be influenced only by a zeal for the decrees of the council of Nice, for the practice of antiquity, and for the rights and privileges of the patriarchal sees of Alexandria and Antioch. During the year 452, Attila, king of the Huns, made an irruption into Italy, soon became master of several important cities, and then bent his march towards Rome, hoping to enrich himself with the spoils of the metropolis. At this time the city was not in a condition to bear a siege, and the emperor sent a solemn embassy

embassy to Attila, with such proposals as might be acceptable to him and his army. Leo himself went at the head of the embassy, in which he was joined by two men of the first rank, and of long experience in negotiations. On their arrival with a grand and numerous retinue, at the enemy's camp, in the neighbourhood of Mantua, they were received by the king of the Huns in a very favourable manner, which the ecclesiastical writers ascribe to the fame of Leo's extraordinary sanctity. The terms which they proposed were readily agreed to by Attila, and a treaty of peace was soon concluded between him and Valentinian, in consequence of which he repassed the Alps, and retired beyond the Danube. In the year 453, Leo's zeal was directed towards the conversion of the monks of Palestine and Egypt, who denounced war against all the abettors of the council of Chalcedon, and massacred, without mercy, such of the clergy and laity, as had the courage to profess a belief in the two natures in Christ. In 455, Leo's attention was drawn off from the affairs of the East, by the calamities produced in Italy, in consequence of the death of Valentinian. That prince was murdered by Maximus, who not only usurped his throne, but obliged Eudoxia, the emperor's widow, to marry him. Determined to revenge the death of one whom she had loved with the greatest tenderness, and to deliver herself from the tyrant, she applied to Genesic, king of the Vandals, in Africa, who she well knew would be glad of any favourable opportunity of invading and plundering Italy. To him she dispatched a confidential messenger, conjuring him to come without delay and rescue her out of the hands of Maximus, assuring him that he would meet with no opposition, and promising to assist him to the utmost of her power. Genesic gladly seized the opportunity, and appeared in a short time with a very powerful army in the neighbourhood of Rome. His appearance struck the Romans with dismay, and instead of preparing for defence, they threw open their gates, and surrendered at discretion. In this extremity of distress, Leo went out to meet the enemy, and endeavoured by prayers and tears to mediate for the safety of the city. The pope could not prevail, and the army of Genesic plundered the city, and carried away the inhabitants into captivity. After spending fourteen days in ransacking the houses, churches, and public buildings, and stripping them of all their wealth, and valuable monuments, the Vandals re-embarked, and returned to Africa with an immense booty, and as many captives as they could carry on board the fleet. These troubles, and the mischiefs which they occasioned, engrossed much of Leo's care and attention to mitigate them, till, on the death of the emperor Marcian in 457, the Eutychians once more obtained the ascendancy in Egypt. The chief of this revolution was Timothy, surnamed *Ælurus*; who assembled his council, consisting of a small number of Eutychian bishops, in which he openly anathematized the council of Chalcedon, pope Leo, and the Catholic bishops. In virtue of this sentence, he excommunicated, deposed, and drove from their sees, all the bishops of the patriarchate of Alexandria, who refused to abjure the faith of Chalcedon, and in their room took care to place such as had distinguished themselves by their zeal for the Eutychian doctrine. In the year 458, the emperor invited Leo to Constantinople, that he might converse with him, in person, on the subjects of the decree of Chalcedon, and the intrusion of *Ælurus*. To this invitation his holiness replied in two letters; one containing his excuses for not undertaking such a journey, and the other intended to explain and confirm, with the testimony of the fathers, the doctrine of the two natures. The last named letter became very famous with the orthodox, and was often

quoted by the writers of that and succeeding ages. After this *Ælurus* gave the pope a public challenge to debate the points in discussion. But Leo refused to comply with the proposal, alleging that it was dangerous and unnecessary to examine anew, or to question what had already been examined and defined by an œcumenical council. From this time Leo continued his efforts, with unabated zeal, in defence of the Catholic cause, and omitted no opportunity of endeavouring to impress the emperor's mind with a sense of the heinousness and enormity of *Ælurus*'s crime. In 460, the bishops of the East united in the same cause with so much ardour, that an order was obtained from the emperor to expel and banish the heretic, which was carried into execution without delay. This event was followed by the election of a Catholic bishop to the see of Alexandria, and the restoration of those prelates who had been displaced for their adherence to the council of Chalcedon. The news of this important change afforded the highest satisfaction to Leo, but the pleasure was of short duration only, as he died in the year 461, having presided over the Roman church twenty-one years. Leo was a man of great learning, and of eminent abilities; but his ambition was unbounded, and with him every object, every consideration was made to yield to his predominant passion for aggrandizing his see, or, in other words, for extending his own power and authority. His works consist of 141 letters, and 96 sermons. The best edition of them was published at Paris in 1675, in two vols. 4to. which was reprinted in folio at Lyons, in the year 1700. The style of Leo's writings is energetic and elegant, though sometimes, in the pursuit of elegance, he renders his discourses too highly polished.

LEO II. pope, a Sicilian by birth, was raised to the papal dignity in the year 682. With the decree confirming his election, he received an account of the proceedings of the sixth general council, held at Constantinople, by which pope Honorius I. was anathematized as a monothelite. In reply to this letter, he says, that he had received this council as he received the five preceding general councils, and anathematized all whom the council anathematized. He also sent letters to the metropolitans of the different provinces of the West, acquainting them with the proceedings of this council, and requiring them to receive it, as well as to cause it to be received by the bishops in their respective jurisdictions. By this conduct he acquired so much interest at court, that he found the opportunity favourable for extending the power of the papal see, and procured an edict, subjecting for ever the see of Ravenna to that of Rome. He died in 683, after a pontificate of only ten months. Five of his letters may be seen in the sixth vol. of the Collect. Concil.

LEO III. pope, born at Rome, was in due time appointed to the office of presbyter in the church; and upon the death of Adrian, in 795, he was unanimously elected to the papal see. Upon his ordination, he wrote to Charlemagne, acquainting him with his promotion, and, at the same time, sending him the keys of the tomb of St. Peter, and the standard of the city of Rome, with other presents, and requesting him to send some fit person to receive the oath of allegiance from the Roman people. The answer of the king was conceived in equally civil and complimentary terms, and it was accompanied with immense treasures to be employed by Leo in repairing and adorning the churches of Rome, especially that of St. Peter. In the year 796, he restored the see of Canterbury to that jurisdiction over all the churches of England, which had been taken away by Offa. Towards the beginning of the year 799, Leo assembled a council at Rome, in which Felix, bishop of Urgella, and Eliphant, archbishop of Toledo, were condemned. During  
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the same year, a conspiracy was formed against Leo, by two nephews of pope Adrian, who had been raised by him to high employments in the church, and governed all things at Rome, during his pontificate, with an absolute sway. To them, indeed, Leo had been greatly indebted for his election, and they supposed that gratitude would have led him to surrender all power into their hands. Leo, willing to shew his own authority, checked them in their designs, and in turn they resolved to put him to death. The attempt was made on the festival of St. Mark, when the pope was proceeding from the Lateran palace to join in an annual procession. The design did not succeed, though he was exposed to the most imminent danger, and was in fact thrown into a dungeon covered with wounds. From his prison he was rescued by the duke of Spoleto, who conveyed him safely into his own territory. From Spoleto the pope wrote to Charlemagne, to acquaint him with the cruel treatment he had met with, and soon after set out on a visit to that prince, to solicit protection against his enemies. Charlemagne received him with the greatest marks of respect and friendship, and after assuring him of his protection, sent him back to Rome, attended with several bishops, and a force sufficient to protect him against any farther attempt of his enemies. He entered the city amidst the loud acclamations of the people, and took possession once more of the Lateran palace, where the nobles and bishops who had accompanied him assembled, and to which all were summoned who had any cause of complaint against Leo, these being commissioned by the king to hear them and do them justice, if in any respect they had been injured by the pope or his ministers. Some did appear, and among these the nephews of Adrian, who accused him of several crimes; but not being able to substantiate the charge, they were sent to prison, tried, and sentenced to death for the conspiracy, in which they had been the principal actors. At the earnest solicitation of Leo their lives were spared, and their sentence exchanged to banishment. About this period, the title of emperor of the Romans was revived in the person of Charlemagne, who, on the proposition of the pope, was saluted Augustus by all classes of the Roman people, and on the day of his coronation received their homage, as well as that of Leo. In 803, the pope having expressed his wish to celebrate the nativity of Christ, with the emperor Charlemagne, the latter sent his son as far as St. Maurice, in the Valais, to meet his holiness, and went himself to Rheims, where he received Leo with extraordinary marks of esteem and friendship. From Rheims they proceeded to Quiercy, where they kept their Christmas, and then repaired to Aix-la-Chapelle. Here, after entertaining him for eight days, Charlemagne dismissed the pope with rich presents, and an escort, who were ordered to attend him as far as Ravenna. In 809, the dispute was revived in France on the question concerning the procession of the Holy Ghost: by the first council of Constantinople, an addition was made to the symbol of Nice, declaring that "The Holy Ghost proceeded from the Father." In the fifth and sixth centuries, the churches of Spain added to the symbol of Nice and Constantinople the word *filioque*, "and from the son," and their example was followed by most of the Gallican churches. The question now under discussion was, whether the expression "*filioque*" ought to be added or omitted. Leo was for the omission, though he adhered to the doctrine attached to it; because he said if it were received by the churches, it would be a fair plea for the addition of many other articles of equal importance. To them more decidedly that he did not approve it, he caused two tables of silver to be set up at the tomb of St. Peter, and the symbol to be engraved in Greek

on one, and on the other in Latin, without the words "and from the son," which, however, were afterwards added to the creed by his successors. Leo passed the remainder of his pontificate in tranquillity, till the death of Charlemagne, his great friend and protector, in 814: when the relations of pope Adrian and their partisans formed another conspiracy against him, with the design of deposing and murdering him. The plot he discovered in 815, some time before it was ripe for execution, and caused all who were concerned in it to be apprehended, and put to death without mercy. It has been said that he glutted his revenge by executing some of the conspirators with his own hands. His severity excited the displeasure of the new emperor Lewis, who commanded his nephew Bernard, king of Italy, to proceed immediately to Rome, and to take cognizance of the whole affair on the spot. The emperor was said to be perfectly satisfied with the pope's justification of his conduct, but the people, who felt for themselves and for their friends, who had been the victims of his cruelty, were not so easily appeased: they destroyed every thing belonging to his holiness that they could get at, and would have excited an insurrection, had they not been suppressed and dispersed by a body of troops under the duke of Spoleto. The pope died in June 816, after he had presided over the Roman church more than twenty years. He left behind him thirteen letters, which are to be found in the seventh vol. of the Collect. Concil. He has been celebrated for having enriched the churches of Rome with the most costly and valuable ornaments, for which he was chiefly indebted to the liberality of Charlemagne.

LEO IV., pope, was born at Rome, and educated in the monastery of St. Martin, ordained sub-deacon by Gregory IV., and presbyter of the Roman church by Sergius II. Upon the death of the latter, he was unanimously elected to the pontifical throne. The first object of his care was to restore to their former splendour, at an immense expence, the churches of St. Peter and St. Paul, which had been despoiled of their ornaments by the Saracens, and likewise to secure them against the future attempts of such plunderers. With this view he resolved to build a new city upon the Vatican, and to enclose it, as well as the church of St. Peter, by a strong wall. This resolution met with the approbation of the emperor, who not only contributed himself to the work, but engaged contributions from his brothers in support of the same cause. With this encouragement Leo set about the undertaking with the utmost diligence and ardour, performing in his own person the daily office of overseer, in all kinds of weather. In 849, he was interrupted in the work by a threatened attack upon the city by the Saracens. The attempt was made, but a storm arising, the enemy's fleet was driven on shore, and almost all the ships dashed in pieces, and those on board perished. Of the vessels that escaped the fury of the waves, some fell into the hands of the Romans, of which the greater part of the crews were hanged, and left on gibbets to strike terror into the minds of their countrymen, and the rest were put into irons, and forced to labour in the pope's new works. While the Romans were celebrating the victory obtained over their enemies, Lewis king of Italy arrived to be crowned emperor, in order that he might share the empire with his father. This was in 850, and in 852 Leo saw his new city completed, which was called, after the founder, the Leonine city. In the following year Leo assembled a council at Rome, for the purpose of restoring discipline, and banishing abuses that had crept into the church: among other things which they did, was the deposition of Anastasius, cardinal presbyter of the church, for absenting himself from his see five years. In the same year, the illustrious Alfred was sent

by his father to Rome, to be educated under the care and direction of the pope. The Saracens continued till to infest the court, notwithstanding their late defeat and consequent disasters: he accordingly fortified the cities on the coast to guard his people from their depredations, and he built a new city which he called Leopolis. Scarcely had he finished this city, when he was surprised with the intelligence that the emperor Lewis was arrived in the neighbourhood of Rome, at the head of a large army. Leo was soon informed of the design of his coming, which was to bring to trial Gratian, commander of the Roman militia, one of the pope's counsellors, who was accused of having solicited another commander to join him in driving out the French, and calling in the Greeks in their room. On the day of trial, the innocence of Gratian appeared perfectly clear, and the accuser was delivered up to be disposed of at pleasure. His life was, however, spared at the solicitation of the emperor. Leo died in 855, after a pontificate of eight years and upwards. He was, according to Anastasus, possessed of all the moral and Christian virtues, without the alloy of a single vice. He left behind him two letters, and a discourse, designed for the instruction of the clergy in the duties of their office, which are to be found in the eighth vol. of the Collect. Concil.

LEO V., pope, a native of Ardea, ascended the pontifical throne in the year 903, but scarcely had he attained to this distinguished honour, before he was deposed by one of his own priests, and thrown into prison, where he shortly died of grief.

LEO VI., pope, a Roman, was elected to the papal dignity on the death of pope John X., in the year 928. He held the high office but about six months, when he was deposed and imprisoned.

LEO VII., pope, a Roman, was raised to the pontifical throne by the unanimous vote of the clergy and people, on the death of John XI., in the year 936. He is highly commended for his zealous efforts to restore ecclesiastical discipline, to reform the monastic orders, and to correct the abuses which prevailed in the Roman and other churches. He died in 939, after having sat on the pontifical throne three years and a half. He has left three letters, inserted in the Collect. Concil.

LEO VIII., pope, though by others styled antipope, was born at Rome, and was chief secretary of the Roman church, an office in which he succeeded his father. Upon the deposition of John XII., in 963, Leo, on account of his excellent character, was elected to the pontifical dignity, with the approbation, if not by the influence, of the emperor Otho. He enjoyed his situation but a short time; the people, infligated by John, drove him from his elevated station, and Benedict was placed there in his stead, the partizans of whom bound themselves by the sanction of an oath, never to submit to Leo, whom they called the emperor's pope. Leo was, however, in a short time restored to his holy office, and died after a pontificate of fifteen months.

LEO IX., pope, was born at Toul, in Lorraine, in the year 1002, and being educated for the church, he was ordained deacon in 1025, and promoted to the bishopric of his native place in the following year. By his conduct in that see he acquired so high a reputation for learning, prudence, and piety, that on the death of pope Damasus II. in 1048, he was chosen as the most fit person to be his successor. He went from Toul in the habit of a pilgrim, and was received by the people at Rome with songs of joy and loud acclamations. An assembly of the clergy and people was convened, at which he informed them of his having been

nominated to the apostolic see by the emperor, but that he did not consider his election valid unless made by them, and that, therefore, they were at full liberty to choose or reject him; and that, if he were not unanimously chosen by them, he would return to his bishopric as willingly as he had unwillingly left it. This address was received with every demonstration of respect and satisfaction, and he was proclaimed sovereign pontiff under the title of Leo IX. In the year 1049 he assembled a council at Rome, which was attended by the Italian and Gallican bishops. By this council all simoniacal bargains were prohibited on pain of excommunication, and some bishops convicted of crimes were deposed from their high rank. When the council was broken up, Leo took a journey into Saxony to visit the emperor, with whom he celebrated the festival of St. Peter and St. Paul at Cologne, and having summoned the Gallican bishops and abbots to meet him at Rheims, he opened a council. At this council, among other excellent decrees, was restored to the people the right of choosing their own pastors. From Rheims Leo proceeded to Mentz, where he held another council of German prelates, at which the emperor, the chief lords and princes of Germany, assisted. Leo returned to Rome towards the close of the year 1049; and in the following spring he visited several Italian cities, restoring every where the decayed discipline of the church. Soon after this he held a council at Rome, which is chiefly memorable for the unjust sentence of condemnation which it passed upon the celebrated Berenger, without hearing him in his own defence, or so much as summoning him to attend. In 1053 he held another council at Rome, in which he condemned the practice of the Greeks, in administering the eucharist with leavened bread, which was one of the principal subjects of a letter addressed by him at this time to Michael Cerularius, patriarch of Constantinople. In the mean time Leo had conceived a jealousy of the Normans, who had made a conquest of Apulia, which they divided into twelve counties. He was strongly prejudiced against them by the Apulians, who represented that their government was cruel and tyrannical, and painted them as barbarians without either laws or religion: he was therefore determined to expel them from Italy, which was one grand object of his last journey into Germany, but the emperor was too much engaged in his own affairs to afford any material assistance in his project. Upon Leo's return he resolved to undertake the task himself. Having therefore assembled a numerous army, he marched with all possible expedition to the borders of Apulia, but before he could gain any decisive advantages, the Normans had put themselves into a posture of defence, and in the end they prepared for offensive measures; and put themselves under the command of Umfred, count of Apulia, Richard, count of Aversa, and the brave Robert Guiscard. These experienced warriors fell upon the pope's army with incredible fury, and after a bloody action entirely routed it with immense slaughter. The pope was now glad to fly, but was obliged in a short time to surrender at discretion. Leo now anticipated the most cruel treatment from those whom he had been accustomed to think, and to treat as barbarous enemies. His apprehensions were soon relieved: Umfred accosted him with all the respect due to his character, and conducted him, attended by the chief officers of the army, to his camp. There he entertained him with great magnificence, and set him at liberty, providing him with an escort. With this behaviour of the Normans, Leo was so greatly pleased, that he absolved them from all the censures which they had incurred, and even approved of the conquests which they had made, and likewise encouraged them to add the reduction of Ca-

labria to that of Apulia. The pope now received a letter from the emperor, in which he expressed a great desire to see the ancient union restored between the sees of Constantinople and Rome, and offered to contribute whatever lay in his power towards so good a work. Before any thing could be done to effect this, the pope was seized with a severe and fatal illness, which put an end to his life in the year 1054, at the age of fifty-two, after having governed the Roman church five years and two months. He was zealous in reforming abuses, and is highly commended for his prudence, his generosity, and his piety. For his attempts to aggrandize the holy see he has been honoured with a place among the saints in the Roman calendar. He was the first pope who made use of the Christian era in the date of his bulls, his predecessors having followed that of the Indictions. Nineteen of his letters are preserved in the ninth vol. of the Collect. Concil. and several of his homilies or sermons were published at Louvain in 1565.

LEO X., pope, born at Florence in December 1475, the second son of Lorenzo de Medici the Magnificent, bore the baptismal name of Giovanni, or John, was originally destined by his father for the church, and received the tonsure at the age of seven years. Being then declared capable of receiving ecclesiastical preferment, Lorenzo obtained two rich abbacies; and the list given of the preferments accumulated upon him at an early age, amounts to the number of twenty-nine, a proof of the great interest of his family, and of the scandalous corruption of the church. It was the great object of his father's ambition to decorate his house with the popedom, and upon the accession of Innocent VIII. to the pontificate, Giovanni, then thirteen years of age only, was nominated to the dignity of cardinal. Lorenzo was not wanting in exertions to make his son worthy of his premature advancement, and the disposition of the youth, which was grave and solid beyond his years, contributed to the success of his instructors. When he was nominated to the cardinalate, it was made a condition that he should spend three years at the university of Pisa in professional studies, before he was invested formally with the purple. In 1492 this solemn act took place, and he immediately went to reside at Rome as one of the sacred college. His father soon after died, and was succeeded in his honours in the Florentine republic by his eldest son Piero. The young cardinal's opposition to the election of pope Alexander VI. rendered it expedient for him to withdraw to Florence, from whence, at the invasion of Italy by Charles VIII. he and the whole family were expelled, and obliged to take refuge in Bologna. About the year 1500 he again fixed his residence at Rome, where he resided during the remainder of Alexander's pontificate, and likewise in the early part of that of Julius II. cultivating polite literature, and the pleasures of elegant society, and indulging his taste for the fine arts, for music, and the chase, to which latter amusement he was much addicted. The depression of his house occasioned frequent embarrassments in his finances, but his cheerful temper supported him under difficulties, and he extricated himself without loss of honour. In 1505 he began to take an active part in public affairs, and was appointed by Julius to the government of Perugia. By his firm adherence to the interest of the pope, the cardinal acquired the most unlimited confidence of his holiness, and was entrusted with the supreme direction of the papal army in the Holy League against the French in 1511, with the title of legate of Bologna. At the bloody battle of Ravenna, in 1512, he was made prisoner, and was conveyed to Milan, where the sacredness of his function caused him to be treated with great respect. The French in their retreat carried the cardinal with them,

but on his arrival at the banks of the Po he effected his escape. About this time the family of the Medici was restored to its former condition at Florence, and the popular constitution of that republic was overthrown. The cardinal contributed to this event, and remained at Florence, till the death of Julius II. called him suddenly to Rome. At the scrutiny for a new pontiff in 1513, the election was declared to have fallen on the cardinal de Medici, who was then only in the thirty-eighth year of his age. He assumed the name of Leo X. and ascended the throne with greater manifestations of good-will, both from Italians and foreigners, than most of his predecessors had enjoyed. One of his first acts was to interpose in favour of some conspirators against the house of Medici, at Florence, and he treated with great kindness the family of Soderini, which had long been at the head of the opposite party in that republic. He exhibited his taste for literature by the appointment of two of the most elegant scholars of the age, Beaubo and Sadoleti, to the office of papal secretaries. With regard to foreign politics, he pursued the system of his predecessor, in attempting to free Italy from the dominion of foreign powers; and in order to counteract the antipapal council of Pisa, which was assembled at Lyons, he renewed the meetings of the council of Lateran, which Julius II. had begun, and he had the good fortune to terminate a division which threatened a schism in the church. Lewis XII. who had incurred ecclesiastical censure, made a formal submission, and received absolution. Having secured external tranquillity, Leo did not delay to consult the interests of literature by an ample patronage of learned studies. He restored to its former splendour the Roman gymnasium or university, which he effected by new grants of its revenues and privileges, and by filling its professorships with eminent men invited from all quarters. The study of the Greek language was a very particular object of his encouragement. Under the direction of Lascaris a college of noble Grecian youths was founded at Rome for the purpose of editing Greek authors; and a Greek press was established in that city. Public notice was circulated throughout Europe, that all persons who possessed MSS. of ancient authors would be liberally rewarded on bringing or sending them to the pope. Leo founded the first professorship in Italy of the Syriac and Chaldaic languages: this was in the university of Bologna. With regard to the politics of the times, the pope had two leading objects in view, *viz.* the maintenance of that balance of power which might protect Italy from the over-bearing influence of any foreign potentate; and the aggrandizement of the house of Medici. When Francis I. succeeded to the throne of France, it was soon apparent that there would necessarily be a new war in the north of Italy. Leo attempted to remain neuter, which being found to be impracticable, he joined the emperor, the Swiss, and other sovereigns against the French king and the state of Venice. The rapid successes of the French arms soon brought him to hesitate, and even to stand aloof, and after the Swiss army had been defeated, the pope thought it expedient to detach his cause from that of his allies, and to form an union with the king of France. These two sovereigns, in the close of the year 1515, had an interview at Bologna, when the famous PRAGMATIC SANCTION (which see), was abolished, and a concordat established in its stead. The death of Leo's brother left his nephew Lorenzo the principal object of that passion for aggrandizing his family, which this pontiff felt full as strongly as any one of his predecessors. Under the influence of this passion, he found a pretext, in 1516, for issuing a monitory against the duke of Urbino, and upon his non-appearance, Leo issued an excommunication against him, and seized

his whole territory, with which, together with the dual title, he invested his nephew. In the same year a general pacification took place, though all the efforts of the pope were made to prevent it. In 1517, the expelled duke of Urbino collected an army, and, by rapid movements, completely regained his capital and dominions. Leo, excessively chagrined at this event, would gladly have engaged a crusade of all Christian princes against him. By an application, which nothing could justify, of the treasures of the church, he raised a considerable army, under the command of his nephew, and compelled the duke to resign his dominion, upon what were called honourable terms. The violation of the safe conduct, granted by Lorenzo to the duke's secretary, who was seized at Rome, and put to torture, in order to oblige him to reveal his master's secrets, imprints on the memory of Leo X. an indelible stain. In the same year his life was endangered by a conspiracy formed against him, in which the chief actor was cardinal Petrucci. The plan failed, and the cardinal, being decoyed to Rome, from whence he had escaped, was put to death; and his agents, as many as were discovered, were executed with horrid tortures. The conduct of Leo on this occasion was little honourable to his fortitude or clemency, and it was believed that several persons suffered as guilty who were wholly innocent of the crimes laid to their charge. To secure himself for the future, the pope, by a great stretch of his high authority, created in one day thirty-one new cardinals, many of them his relations and friends, who had not even risen in the church to the dignity of the episcopal office; but many persons also who, from their talents and virtues, were well worthy of his choice. He bestowed upon them rich benefices and preferments, as well in the remote parts of Christendom, as in Italy, and thus formed a numerous and splendid court attached to his person, and adding to the pomp and grandeur of the capital. During the pontificate of Leo X. arose the daring Luther, whose life will be given farther on; nevertheless, in this place, we must notice certain facts with which Leo and the reformation are closely connected. The unbounded profusion of this pope, in every object of expence attached to a taste for luxurious magnificence, had rendered it necessary to devise means for replenishing his exhausted treasury; and one of those which occurred was the sale of those indulgences which the church claimed a right of dispensing from the store of her spiritual wealth. The commissaries appointed for this traffic in Germany, exaggerated the efficacy of their wares in such very extravagant terms, as gave great offence to the pious and thoughtful. Luther, a public preacher at Wittemberg, warmly protested against this abuse in his discourses, and in a letter addressed to the elector of Mentz. He likewise published a set of propositions, in which he called in question the authority of the pope to remit sins, and made some very warm strictures on this method of raising money. His remonstrances produced considerable effect, and several of his cloth undertook to refute him. Leo probably regarded theological quarrels with contempt, and from his pontifical throne looked down upon the efforts of a German doctor with scorn; even when his interference was deemed necessary, he was inclined to lenient measures. At length, at the express desire of the emperor Maximilian, he summoned Luther to appear before the court of Rome. Permission was, however, granted for the cardinal of Saxa to hear his defence at Augsburg. Nothing satisfactory was determined, and the pope, in 1518, published a bull, asserting his authority to grant indulgences, which would avail both the living, and the dead in purgatory. Upon this, the Reformer appealed to a general council, and thus open war was declared, in which the

abettors of Luther appeared with a strength little calculated upon by the court of Rome. The sentiments of the Christian world were not at all favourable to that court. "The scandal," says the biographer, "incurred by the infamy of Alexander VI., and the violence of Julius II., was not much alleviated in the reign of a pontiff who was characterized by an inordinate love of pomp and pleasure, and whose classical taste even caused him to be regarded by many as more of a heathen than a Christian."

The warlike disposition of Selim, the reigning Turkish emperor, excited great alarms in Europe, and gave occasion to Leo to attempt a revival of the ancient crusades, by means of an alliance between all Christian princes; he probably hoped, by this show of zeal for the Christian cause, that he should recover some of his lost credit as head of the church. He had, likewise, another object in view, *viz.* that of recruiting his finances, by the contributions which his emissaries levied upon the devotees in different countries. By the death of Maximilian in 1519, a competition for the imperial crown between Charles V. and Francis I. took place. Leo was decidedly against the claims of both the rival candidates, and attempted to raise a competitor in one of the German princes, but he was unable to resist the fortune of Charles. At this period he incurred a very severe domestic misfortune in the death of his nephew Lorenzo, who left an infant daughter, afterwards the celebrated Catherine de Medicis, the queen and regent of France. The death of Lorenzo led to the immediate annexation of the duchy of Urbino, with its dependencies, to the Roman see, and to the appointment of Giulio, Leo's cousin, to the supreme direction of the state of Florence. (See CLEMENT VII.) The rapid progress of the Reformation forcibly recalled the attention of the papal court, and Leo, anxious for an amicable negotiation, employed a Saxon nobleman to treat in person with Luther, but the matter was, at this period, carried too far to admit of reconciliation. Luther appealed to the scriptures for his authority; and the pope insisted upon unqualified submission to the decrees of the Catholic church. The Reformer was persuaded to address a letter to his holiness; but, instead of expressions of humiliation, it contained much bitter invective against the court of Rome. It was, therefore, determined to condemn him and his doctrines; and a bull to that purpose was issued, June 15th, 1520, which occasioned a total separation between the papal see and the reformers. The writings of Luther were publicly burnt, an insult which he boldly retaliated by an equally solemn and public conflagration of the papal decrees and constitutions, and the bull itself. Leo was not satisfied with his own exertions, but was desirous of gaining on his side the Imperial court. Before, however, the emperor would condemn, he determined to hear, in person, what Luther had to say in his own justification, and a mandate was issued for his appearance at Worms. (See LUTHER.) We may observe here, that Leo conferred on Henry VIII. of England the title of "Defender of the Faith," for his appearance on the side of the church as a controversial writer. The tranquil state of Italy, at this period, allowed the pope to indulge his taste for magnificence in shows and spectacles, and in the employment of those great artists who have reflected so much lustre on his pontificate. His private hours were chiefly devoted to indolence, or to amusements, frequently of a kind little suited to the dignity of his high station. He was not, however, so much absorbed in them as to neglect the aggrandizement of his family and see. Several cities and districts in the vicinity of the papal territories, and to which the church had claims, had been seized by powerful citizens, or military adventurers; some of these

the pope summoned to his court to answer for their conduct; and in default of an exculpation of their crimes, he caused them to be put to death. His holiness next laid a plan to get into his possession the city and territory of Ferrara. He had set his heart upon this object, and being unable to attain it by open means, he had recourse to treachery, and it has been asserted that his plan included the assassination of the duke. The commander of a body of German troops was bribed to deliver up one of the gates to the papal forces, which were to be in readiness; but he took the pope's money, and apprized the duke of the plot, which was thus happily defeated. Another project, which entered deeply into the views of the pope, was the expulsion of the French from Italy. In 1521, he formed a treaty with the emperor for the re-establishment of the family of Sforza, in the duchy of Milan. He engaged a large body of Swiss in his service, who, under the pretence of different measures, made much progress against the French, and drove their troops before them; but in the midst of these successes, and while public rejoicings were making in Rome on account of them, the pope was seized with an illness, which at first was considered as a slight cold only, but which put an end to his life in a few days. This event happened on the 11th of Dec. 1521; when Leo was in the 46th year of his age, and the ninth of his pontificate. The people at large expressed much concern at his death, but the honours rendered to his memory were not such as might have been expected. An exhausted treasury was the pretext for an economical funeral, and amidst all the eminent scholars of his court, an illiterate chamberlain was appointed to pronounce his funeral oration. Leo was himself but moderately furnished with solid erudition: he afforded liberal encouragement to useful and reputable studies, but he also lavished his patronage upon productions and persons of an opposite character. The merit of a sovereign in promoting those ornamental arts by which alone he can display a magnificence superior to that of a private citizen, can rank no higher than an exertion of good taste; and this quality may be undoubtedly conceded to Leo. He was, however, rather the unfortunate inheritor, than the creator of great talents. Michael Angelo and Raphael had both risen to fame under his predecessor, Julius II., who had planned and made a commencement of the stupendous edifice of St. Peter's: the Vatican palace had likewise received some of its noblest ornaments in his and the former pontificates. But the reader who wishes to obtain an accurate view of the state of literature and the arts in Italy prior to, and during the reign of Leo, will have recourse to Mr. Roscoe's "Life and Pontificate of Leo X.," from which the foregoing facts are principally drawn. The character of this pontiff has been finely celebrated by Pope in the following lines:

But see! each muse, in Leo's golden days,  
Starts from her trance; and trims her wither'd bays;  
Rome's ancient Genius, o'er its ruins spread,  
Shakes off the dust, and rears his rev'rend head.  
Then sculpture and her sister arts revive:  
Stones leap to form, and rocks begin to live;  
With sweeter notes each rising temple rung,  
A Raphael painted, and a Vida sung.

LEO XI., pope, the son of Octavian de Medici, cousin of Cosmo, duke of Tuscany, was born in the year 1535. He was made archdeacon of Florence, and filled the post of ambassador from Francis, the great duke, at the court of Rome. He was created cardinal by Gregory XIII., and by Clement VIII. he was sent legate to Henry IV. of France, and he was successfully employed in adjusting the

terms of peace between Philip II., king of Spain, and the French monarch, and for his good offices he received from the latter a noble present. On the death of pope Clement VIII., in the year 1605, he was elected pope by the unanimous suffrages of the conclave when he took the name of Leo XI. The Romans and Florentines were highly delighted with his elevation on account of his distinguished talents and virtues, and because they knew that to his zeal for the interests of the church, he united a liberal spirit, a love of learning and learned men, and, as it were, an hereditary taste for the polite arts. On the day of the profection, when the pope commences his office with great pomp and form, the several orders of the city endeavoured to surpass each other in their demonstrations of joy on the occasion. Their satisfaction, however, was of very short continuance, and was speedily changed into grief and mourning, on account of his death, which happened on the 25th day after his election, in the 70th year of his age. Bower's Lives of the Popes. Bayle. Moreri. Lardner.

LEO ALLATIUS. See ALLATIUS.

LEO, the *Grammarians*, of whose personal history nothing is come down to us, was author of a continuation of the Chronicle of Theophanes, in the Greek language, comprising the lives of the seven emperors of the East, from the year 813 to 1013. It is annexed to Combes's edition of the chronicle, printed at Paris in 1655. Moreri.

LEO, JOHN, named *Africanus*, a traveller and geographer, was a native of Granada of Moorish extraction. When that city was taken by Ferdinand and Isabella, in 1492, he retired into Africa, and on that account obtained his surname. He studied the Arabic at Fez, was employed by the king as ambassador, and took several journeys into Europe, Lesser Asia, and Africa, of which he wrote a narrative in the Arabic language. He once fell into the hands of some pirates, and was sold as a slave to a master, who presented him to Leo X. The pontiff highly esteemed him on account of his learning and knowledge, and having persuaded him to renounce Mahometanism, gave him his own names of John and Leo at the time of his baptism. He now applied himself to the attainment of the Italian language, and translated into it his description of Africa. This work is reckoned one of the most curious of the early voyages and travels. The author describes what he had himself seen, chiefly on the northern and western coasts of that peninsula, and it supplies deficiencies from the relation of others; but as a geographical work it has various imperfections and defects. It has been translated into Latin and French. Leo probably died soon after he had rendered his work into the Italian language in 1526. He was author likewise of a treatise "De viis Philosophorum;" printed at Zurich in 1664. Moreri.

LEO of Orvieto, born in the territory of Orvieto, in Tuscany, became a monk of the Dominican or Franciscan order, who flourished towards the commencement of the fourteenth century. He was author of two "Chronicles," one of the popes, down to the year 1314; and the other of the emperors, terminating at the year 1308. They were brought into notice by John Lamy, who published them in his "Deliciae Eruditorum, seu Veterum Anecdota Opusculorum Collectanea," printed at Florence. Both the chronicles were published in 1737, in two volumes 8vo., with notes and illustrations. The second volume contains a sketch of the history of France, written by John de l'Isle, supposed to have been a monk of the abbey of St. Dennis, in the 15th century, entitled "de Gestis et Factis memorabilibus Francorum." Moreri.

LEO DE MODENA, a learned rabbi, whose Jewish name was

was R. Jehudah Arie, was born at Modeva, and flourished in the seventeenth century. He was for a considerable time chief of the synagogue, and esteemed a good poet both in Hebrew and Italian. He was author of a valuable work on the ceremonies and customs of the Jews, which is held in estimation by the learned of all nations. It is entitled "Iloria de Riti Hebraici, vita et Observanze de gli Hebrei di questi Tempi;" the best edition of this work was printed at Venice in 1638. It was translated into the French language in 1674, by Richard Simon, with supplements relating to the sects of the Karaites and Samaritans. Leo meant to have given an Italian translation of the Old Testament, but he was prohibited from pursuing it by the Inquisition. He compiled a Hebrew and Italian dictionary, entitled "The Mouth of the Lion." This work was published at Venice in 1612, and was afterwards reprinted in an enlarged form at Padua, in 1640. Leo died at Venice in 1654, in about the eightieth year of his age.

LEO DE ST JOHN, a French monk, born at Rennes in the year 1600. Before he entered into the religious profession, his name was John Macé. He was nominated to all the honourable and confidential posts of his order, and acquired the esteem of popes Leo XI., and Alexander VIII. and of several cardinals. He was an eloquent preacher, and had the honour of performing the duties of his office before Lewis XIII. and Lewis XIV. He was the friend of cardinal Richelieu, by whom he was patronized. He died in 1671, leaving behind him numerous works, the principal of which is entitled "Studium Sapientie Universalis," in three volumes folio. His "History of the Carmelites;" "Lives of different Romish Saints;" and "Journal of what took place during the last Sickness, and at the Death of Cardinal Richelieu," are well known and frequently referred to.

LEO, in *Botany*, a name used by some authors for the columbine, or *aquilegia*. Columella, besides others, calls it by this name. See *AQUILEGIA*.

LEO, the *Lion*, in *Zoology*. See *FELIS Leo*.

LEO, *Formica*. See *FORMICA Leo*.

LEO *Pulex*, a name given by M. Reaumur to a species of insects which feeds on the *pulex arboræus*, or common tree-lice, in the same manner that the creature called the *formica leo* does on the ants: this being also, like that, an animal, yet in an imperfect state, and finally to be changed into a different creature. This author has kept up the remembrance of this analogy between them, by giving this a similar name.

The *leo pulex* is usually bred among the herds of the pulices, which he devours most unmercifully. He is a worm of the hexapode, or six-legged kind, and very soon arrives at the time of his change; after which he becomes a green fly with four wings. Another animal of this kind, and not less destructive of this small race of animals, is a six-legged worm of a whitish colour, and smaller than the former, which finally becomes a round-bodied beetle. Another species of these devourers this author calls *vermis hystrix*, the porcupine-worm, from the vast number of spiculae, or tender prickles, with which he is armed. This also finally becomes a round and final beetle. Reaumur, Hist. Insect. tom. i. See *LION pueron*.

LEOBEN, or LEUBEN, in *Geography*, a town of the duchy of Stiria, on the Muehr; 68 miles S.W. of Vienna. At this town the preliminaries of peace between the emperor and the French republic, were settled on the 20th of April 1797. N. lat. 47° 22'. E. long. 14° 55'.

LEOBSCHUTZ, or LUBSCHUTZ, a town of Silesia, and capital of a circle, in the principality of Ingerndorf; 16 miles N. of Ratibor. N. lat. 50° 5'. E. long. 17° 44'.

LEOCROCOTTA, in *Natural History*, a name given by the ancients to an animal said to be the swiftest of all creatures in the world. It is described as a mongrel or bastard animal, unable to propagate its own species, being begotten upon the hioness by the male hyæna of some of the larger kinds: but is one of those animals, the existence of which is much to be doubted. The Latin authors have made some confusion between this creature and the mantichora, attributing the things that have been said of one to the other.

LEOGANE, in *Geography*, a sea-port town of the island of Hispaniola, or St. Domingo, on the N. coast. It was once the seat of the French government. Although its situation is not good, the air is salubrious, and the soil of the adjacent territory is fertile. In 1796, it was taken by the British. It is a place of considerable trade, N. lat. 18° 30'. W. long. 73° 25'. See *ST. DOMINGO*.

LEOGANE, *Bay* or *Bight* of, called also *Cul de Sac* of Leogane, lies at the W. end of the island of St. Domingo, and is formed by two peninsulas. It opens between Cape St. Nicolas at the W. end of the N. peninsula, and Cape Dame Marie, the N.W. point of the S. peninsula, 45 leagues apart. At the bottom of the bay, which embosoms a vast number of other fine bays, are the islands Gonave, and on the N. side of the S. peninsula the isles Refif and Caymite. The town of Leogane is situated on the N. side of the neck of the S. peninsula, in the bay of Leogane, at the head of a small bay which sets up E. from the bay of Grand Goave, four leagues N.E. of the town of that name. See *ST. DOMINGO*.

LEOMINSTER, or LEMSTER, a borough and market-town in the hundred of Wolphy, and county of Hereford, England, is situated in a very rich and fertile vale abounding with orchards, hop-yards, fine meadows, and arable lands. Its immediate site is, as Leland describes, "somewhat low, and all the ground very neere about it is farre lower." The river Lugg flows on its north and east sides; two smaller streams run through the town, and three other considerable rivulets pass it within half a mile. Its extent from north to south is nearly a mile; and from east to west about half a mile. "The towne of Leonminster," Leland says, "is metely large, and hath good buildinges of tymbre. The towne, by reason of their principall wool, use great draping of clothe, and thereby it flourished. Synes of latter days it chanced that the cittyes of Hereford and Worcester complained of the frequency of people that came to Lemster, in prejudice of bothe their marketts; whereupon the Saturday markett was removed from Lemster, and a markett on Friday newly assigned to it; synes that time the towne of Lemster hath decayed. The antiquity of the towne is most famous by a monastery of nunes, that Merwaldus, kinge of the Marches, built and endowed"—"There is but one paroch church in Leonminster; but it is large, somewhat dark, and of ancient building, inso much that yt is a greate likelihood that yt is the church that was afore the conquest. The common fame of the people about Lemster is, that king Merwald, and some of his successors, had a castle, or palace, on an hill side by the towne of Leonminster, half a mile off by east." In the year 1055, Leonminster was seized upon by the Welsh chieftains, who strengthened it by fortifications, the remains of which may be traced even at the present period. The town appears to have been a place of some consequence at the time of the Domesday survey; as that register records that the manor, with its appurtenances, consisting of sixteen dependent estates, had been assigned by Edward the Confessor to his queen Editha; and that it was governed by eight bailiffs,

eight beades, and eight free tenants. When the survey was made, the manor belonged to the king; great part of the customary rent was paid as composition for salt, fish, and cels. Here was also a wood fix miles in length, and three broad; but part of it was even then begun to be "afforded," and cleared for tillage; "an acree of hawks" is also mentioned in the same record. About the time of William Rufus, the fortifications of Leominster were strengthened and enlarged, the better to secure it against the incursions of the Welsh. In the reign of king John, William de Braose, lord of Brecknock, a turbulent and high-spirited baron, plundered this town, and burned great part of it, together with the priory and church. In Henry IV.'s reign, Leominster was for some time in the possession of Owen Glendour, after he had defeated the earl of March. In the next century, the inhabitants of this town took a decisive part towards the establishment of queen Mary on the throne; for which service she granted them the first regular charter of incorporation, with many valuable privileges. An annual fair had been granted in 1170, by Henry II.; two additional fairs, each of six days continuance, were granted by Edward I.

The church of Leominster, having been partly destroyed by fire March 18, 1700, was re-edified at the expence of nearly 17,000*l.*; the whole of that part used for divine service being entirely new. The church in its present state is irregular, both in its form and architecture. The most ancient parts are the east wall, the north side, the tower which stands at the north-west angle, the west end, and the wall and windows of the fourth side. In the interior the chief part is modern, excepting what is called the back aisle, which, as well as the lower part of the tower, is principally of Saxon workmanship. The exterior of the east end has three large buttresses, a high pointed window with intersecting mullions, and two smaller windows. On the north side is a very strong semi-circular arched door-way, with a smaller one within it. The upper part of the tower is in the pointed style and embattled; the lower part is Saxon; it displays a singularly rich entrance door-way on the west, having a recessed arch, with three pillars on each side, the capitals of which are ornamented with sculptures of foliage, a couchant man, a tyger, snakes entwined round branches, and birds. The mouldings supported by these pillars are slightly pointed, but are embellished with lozenges and zig-zag work. On the north side of the church is the nave and north side of the ancient structure, which are separated from each other by a range of massive circular columns, with round arches, over which are Saxon arcades; the arch of the tower which opens into this part is pointed, and reaches nearly to the roof. Besides the church, there are four places of religious worship in the town, for the respective denominations of Baptists, Presbyterians, Moravians, and Quakers. During the time of rebuilding the church, divine service was performed in a contiguous building, anciently called the Chapel in the Forbury, erected by Peckham, archbishop of Canterbury, about the end of the thirteenth century. It was afterwards appropriated to the purpose of tuition, and thence called the school-house; but has lately been converted into a regular theatre; it is a plain building, with pointed windows. The priory was situated to the north-east of the church, on the little river Pinstley; some of the buildings are yet standing, among which is the priory-house, which has undergone various alterations since the dissolution. The town-hall, or butter-cloze, as it is commonly termed, is a singular building, constructed of timber and plaster about the year 1633. The architect was the celebrated John Abel, who built the Shire-hall at Hereford,

in the year 1645. This fabric stands on twelve oak pillars, sustained on stone pedestals; the brackets and spandrels above the arches, and the upper parts of the building, display much carving. A new gaol was erected in the year 1750; and a market-house in 1803. Several improvements have been recently made in the town; the trade is flourishing, and many of the shops are respectable. The clothing and hat trade provide employment for a great number of the inhabitants. The wool grown in the vicinity is proverbially excellent; the cyder also, and the hops, are held in high estimation.

The corporation consists of a bailiff, chief steward, recorder, twenty-four capital burgesses, a chamberlain, and two serjeants at mace. Two representatives in parliament are chosen by the corporation and inhabitants paying scot and lot; the number of voters being about 500; the earliest return was in the twenty-third of Edward I.

Leominster is 137 miles distant from London; the population, as returned under the act of 1800, amounted to 3019; the number of houses to 736. The site of the castle or palace mentioned by Leland as belonging to Merwald, is supposed to be the mount to the eastward which overlooks the Hay lane.

Berrington, about four miles to the north-east, was the seat of the late Right Hon. Thomas Harley. About a mile to the south-east from the town is Eaton, formerly the seat of the Hackluys, a family of great antiquity and respectability. On the Brierley hills, about two miles south-westward from Leominster, is Ivinton camp, a strong fortification divided into two parts by an entrenchment more modern than the outer works. This is supposed, with great probability, to be the camp occupied by Owen Glendour. Price's History of Leominster, 8vo. Beauties of England and Wales, vol. vi.

LEOMINSTER, a post-town of America, in Worcester county and state of Massachusetts; 46 miles W. of Boston. It has a printing office and several neat buildings. This township was taken from Lancaster, incorporated in 1740, and contains 1486 inhabitants. On the streams that pass through this town are several mills of different kinds. About 200,000 bricks are annually made here. The manufacture of combs is also carried on in great perfection and with considerable profit.

LEON, in *Ancient Geography*, a promontory of Greece, in the isle of Eubœa.—Also, a promontory of the isle of Crete.—Also, a river of Phœnicia. Ptolemy.

LEON, in *Geography*, a province of Spain, called a kingdom, situated towards the N.W., and inclosed between Estremadura, Old Castile, Galicia, and Portugal. Its form is a kind of irregular long rectangular figure. Its mean length from N. to S. is estimated at about 52 leagues, and its mean breadth from E. to W. about 30 leagues. This is the country which was formerly inhabited by the Vettones, mentioned by Strabo. It is bounded on the E. by Old Castile; on the S.E. and S. by Estremadura; on the W. by the provinces of Beira, Tral-os-Montes in Portugal, and Galicia; and on the N. by the Asturias. Its capital has given name to the country, which was for a long time a separate monarchy; but its crown was united with that of Castile in 1069; but without losing the title of kingdom. Its territory is mountainous; nevertheless it contains many beautiful fields, good pastures, and large fertile vallies, which produce a great quantity of grain, as wheat, barley, &c. wine, and excellent flax, both in small quantities, vegetables, and good fruits. Its mountains are covered with different kinds of trees, and they afford iron and copper mines, mineral waters, &c. The mules bred in this country are of a super-

rior kind, and it furnishes a good number of sheep. The river Duero almost bisects the country. The kingdom of Leon contains six bishoprics, *viz.* those of Leon, Salamanca, Palencia, Zamora, Astorga, and Ciudad Rodrigo; six cathedral chapters, nine collegiate chapters, 2460 parishes, as well rectories as vicarages; 196 convents, 23 hospitals, five asylums, two military governments, four intendencies of provinces, a celebrated university, four superior colleges, 25 colleges of all classes, six cities, 539 towns or boroughs, 2005 villages or settlements, of which 76, formerly inhabited, are now deserted. Its mountains that are particularly distinguished are those that form part of the Sierras of Pico and Occa, formerly mount Idubeda; the former extends from the E. of the southern point of the kingdom of Leon to the W. of the southern point of Old Castile; the latter comes from the N. by E. point of Old Castile, and extends a little way into the kingdom of Leon, at the S. point of the E. Amongst its rivers, which are numerous, we may reckon the Sil, the Buroia, the Sabor, the Baeza, the Arago, the Xero, the Pisuerga, the Alagon, the Agueda, the Cea, the Exla, the Tuerta, the Obrega, and the Berneſga, almost all of which rise in Leon or near its confines; the Duero, the Carrion, the Erefina, Rio de Salamanca or Torme, &c. The principal towns of Leon are, on the N. of the Duero, Leon, Astorga, Zamora, Toro, Palencia, Medina-del-Rio-Secco, Tor-de-Sillas, Villa Pando, Duenas, Marſilla, Villa Franca, and Benevente; and on the S. of the Duero, Salamanca, Ciudad Rodrigo, Alva-da-Tornes, Pena-Aranda, Pena-de-Frania, Carpio, Medina-del-Campo, and Ledefma near Los Banos.

When the Gothic king Roderic was defeated by the Moors in the battle of Xeres de la Frontera, the fugitives dispersed to Galicia, Asturias, Lower Biscay, and the country at the foot of the Pyrenees; but their courage revived and they rallied their forces under prince Pelagius, who, in 717, obtained a signal victory over the Moors, and took possession of Oviedo, of which he was acknowledged king. Having regulated this little state, and gained new subjects, he again attacked the Moors, and retook from them the town of Leon, and some others. Thus was laid the foundation of this new kingdom, although Pelagius and his successors only took the title of kings of Oviedo or the Asturias, till Ordagno II. who in 915 assumed the title of king of Leon. The kingdom of Leon passed, in the year 1030, to Ferdinand, surnamed the Great, then king of Castile, by his wife. In the kingdom of Leon there are 5598 secular priests, 2064 monks, 1570 nuns, 196 convents, 2460 parish churches, 2695 villages, 31,540 nobles, 25,218 servants, and near 600,000 other inhabitants of all professions; which gives a total of about 665,000 persons. The agriculture of this country might be much improved, if the inhabitants availed themselves of the water which their rivers supply in the irrigation of the land. They are also negligent in the culture of fruit trees, and though they have fine rich pastures, their flocks are removed from one part of the country to another. The commerce of this province consists chiefly of importation, and it scarcely furnishes any thing to the neighbouring provinces. It sends to Galicia part of the serges and baize manufactured at Rio Seco; but this is very trifling compared with the goods which it is obliged to import. It traffics in some wines, some of which, of an excellent kind, are found in the country towards the S.E. Palencia had formerly considerable manufactories for cloth. At Zamora there is still a manufactory for hats; and they make some household cloths in the country. The English, by way of Portugal, carry away the madder of the environs of Ciudad Rodrigo, and of Medina-del-Campo. In the province of

Leon there are four springs of cold mineral waters. *viz.* at Amusco, about 31 leagues from Palencia, at Buron, at Bavila-Fuente, four leagues E. of Salamanca, and Aſudillo, nine leagues from Palencia. There are also four thermal springs, *viz.* near Almeyda, at Ledefma, at Bonar or Bonah, six leagues from Leon, and at Barnos, near the frontiers of Estramadura and Castile. The inhabitants of this province are very grave, and addicted to taciturnity; those who retain remains of the national manners of Spain, and who live in the mountains in the Mauregatos, near Astorga, wear pyramidal hats, a kind of ruff round the neck, a jacket or shirt, and close coat, wide breeches and spatterdashes. The women of Mauregatos wear large ear-rings, a kind of white turban, flat and widened like a hat, and their hair parted on the forehead. They have a chemise closed over the chest, and a brown corset buttoned, with large sleeves opening behind. Their petticoats and veils are also brown. Over all they wear immense coral necklaces, descending from the neck to the knee; twisting them several times round the neck, passing them over the shoulders, where a row is fastened that forms a kind of bandage over the bosom; another row is suspended lower than this; and also a third and even a fourth row at some distance from each other. The last falls over the knee, with a large cross on the right side. These necklaces or chaplets are ornamented with many silver medals, shaped with the figures of saints. These ornaments are chiefly worn on festivals. On the days of religious solemnities, particularly the Assumption, the fronts of the churches are illuminated, bonfires are made before them, musicians attend, and the people dance all night; the women play the castanets, and are accompanied by an instrument called "Panderero," which is a kind of tambour de basque. De Laborde's View of Spain, vol. ii.

LEON, *Legno*, the capital of the above province, or kingdom, is a very ancient town, founded before the reign of Galba; it was called by the Romans "Legio Septima Germanica," from the legion that bore that name being stationed there. This city is situated between the two sources of the Exla, which are called the rivers of Torio and Berneſja. This is one of the most famous and most ancient episcopal sees in Spain, and possessed, in the time of the Gothic kings, the privilege of appealing immediately to Rome. The bishop is suffragan to the archbishop of Compostella, without being in any respect dependent on its jurisdiction; this bishopric possesses a revenue of 22,000 ducats. Its diocese contains 823 villages, 883 parishes, 26 convents of monks, 11 of nuns, collegiate, and hospitals. When the kings resided here, till the 13th century, its population was considerable; but it is now much reduced. According to the statement of 1788, there were within the jurisdiction of the intendant of Leon 250,134 inhabitants. A great part of its walls consists of green marble. It contains 13 parish churches, one collegiate church, four convents of monks, five of nuns, and a number of hospitals and hermitages. Here are the royal houses of San-Isidoro and San-Marios of the order of St. James; and a chapter of noble canons, not cloistered, but who take the vows. This town was the first of any importance which the Christians retook from the Moors. Pelagius made himself master of it in 722, fortified it, and built a good castle, to defend the approaches to it.

It had the honour of being the capital of the first Catholic kingdom of Spain, and of being, for three centuries after the invasion of the Arabs, the residence of the kings. The palace which the duke of Alphonso built here at the end of the 12th century is still to be seen. Among its most splendid edifices we may reckon the cathedral church, which in beauty surpasses the most admired in Spain, and is one of the most attractive

attractive monuments of Gothic architecture. The hotel of the counts of Luna is also large and handsome. The town-house has a good appearance, with a tolerably regular front. The palace of the Guzman is magnificent, ornamented with a superb portal, and secured by very strong walls. Among the gates of the town one was formerly a famous prison; and at the bottom is the statue of king Don Pelagius, with an inscription. The Place Mayor has a beautiful appearance. There is a number of other squares and handsome fountains. Notwithstanding the antiquity and importance of this city it is very deficient in cleanliness. It is surrounded by trees, and the country about it is every where embellished; it has beautiful promenades, as well as broad and noble avenues of handsome trees. In the environs of the town the corn harvests are not abundant; but this deficiency is supplied by many excellent vegetables, fruits, flax, and verdant meadows, which furnish good pastures. At Leon there are several manufactories for different woollen articles; stockings, hosiery, leather, gloves, &c. are also made here. Leon is 150 miles N.W. of Madrid. N. lat. 42° 36'. W. long. 5° 37'.

LEON, a town of Spain, in Catalonia; 43 miles N.W. of Urgel.

LEON, a town of France, in the department of Stura; 4 miles N. of Savigliano.

LEON, *Isle of*, a kind of island four leagues from Xerez, in Andalusie, formed by a canal which furrounds it, ten miles long, and 24 feet deep in high water, and capable of admitting the largest ships. This island was entirely deserted in the seventeenth century, and there was scarcely a house upon it. At present the principal street of the town is two miles long, with rows of shops on each side, and containing upwards of 2000 inhabitants. Provisions are here abundant, and the place exhibits a moving scene. The island has an alcade-mayor for the administration of justice; a municipality composed of a number of regidores, and a manufacture of stained linen, resembling printed calico.

LEON, a river which falls into the gulf of Mexico, from the N.W., at the bay of St. Bernard.

LEON, a town of Mexico, in the province of Guadalarajara; 40 miles E. of Guadalajara.

LEON, a town of Mexico, and capital of the extensive province of Nicaragua, situated on a large lake of fresh water, abounding with fish. It is a bishopric, but a town of little importance. It has about 1200 houses, four churches, and several convents. Its situation near a mountain, in which is a volcano, renders it subject to earthquakes. The lake is said to ebb and flow like the sea. Realjo is a small entrenched town, with an excellent port, and serves Leon the capital.

LEON of *Caraccas*. See CARACCAS.

LEON of *Guanuco*. See GUANUCO.

LEON, *New*, one of the seven domains, called kingdoms, into which the Spanish dominions in North America are distributed. This name is restricted by the maps to a small province round the town of Monterey, which must not be confounded with another of the same name, to the N. of California. It is bounded on the N. by the Savage nations, on the E. by New Mexico Proper, on the S. by a part of Mexico, and on the W. by New Biscay. New Leon proper, a district ridiculously called a kingdom, is divided from Guadalcazar on the S. by the desert of Jaumave, and mountains of Tamalipa. It is very mountainous, produces little except lead, and is very thinly peopled. The other provinces of the domain of New Leon, besides New Leon proper, are Sootander and Coaguila, or New Estramadura.

LEONAN, a small island in the East Indian sea, near

the N.E. coast of Borneo. N. lat. 6° 39'. E. long. 117° 48'.

LEONARD of Pisa, in *Biography*, an Italian mathematician, who flourished at the commencement of the thirteenth century, was the first person who brought into Europe the knowledge of the Arabic cyphers and algebra. He gives an account of the fact himself, and says, that being at Bugia, a town in Africa, he was instructed in the Arabic method of keeping accounts, and that, finding it more convenient, and preferable to the European method, he had drawn up a treatise for the purpose of introducing it into Italy. From Italy the knowledge of the Arabic cyphers and algebra was afterwards communicated to the other countries of Europe. He was author of a treatise on surveying, preserved in the Magliabecchi library at Florence.

LEONARDO LEO, principal organist of the chapel royal at Naples, was not only admired and respected by his contemporaries, but his memory still continues to be held in reverence by every professor that is acquainted with his works. The first opera of his composition that we were able to find, is "Sofoniba," which was performed in Naples in 1718, and the last, "Siface," in Bologna, 1737. Between these he produced three operas for Venice, and four for Rome. Leo likewise set the "Olimpiade" of Metastasio, in which the duo, "Ne i giorni tuoi felice," and the air, "Non so donde viene," are admirable; as is "Per quel paterno amplesso," in Artaserse, the only air in that opera that we have seen. "Dirti hen mio voice," was in extreme high favour, as set by Leo, about the middle of the last century, in England, where it was sure to be heard at every musical performance, both public and private. Leo likewise set Metastasio's oratorio of "St. Elena al Calvario," of which we have seen some very fine airs. His celebrated "Miserere," in eight real parts, though imperfectly performed in London at the Pantheon, for Aniani's benefit, 1781, convinced real judges that it was of the highest class of choral compositions.

The purity of his harmony, and elegant simplicity of his melody, are no less remarkable in such of these dramas as we have been able to examine, than the judicious arrangement of the parts. But the masses and motets, which are carefully preserved by the curious, and still performed in the churches at Naples, have all the choral learning of the sixteenth century. There are likewise extant, trios, for two violins and a base, superior in correctness of counterpoint and elegance of design to any similar productions of the same period. This complete musician is equally celebrated as an instructor and composer; and the "Solfeggi," which he composed for the use of the vocal students, in the conservatorio over which he presided at Naples, are still eagerly sought and studied, not only in Italy, but in every part of Europe, where singing is regularly taught.

This great musician died about the year 1742, at the age of fifty-three. His death was unhappily precipitated by an accident which at first was thought trivial; for having a tumour, commonly called a *bur*, on his right cheek, which growing, in process of time, to a considerable magnitude, he was advised to have it taken off; but whether from the unskillfulness of the operator, or a bad habit of body, a mortification ensued, which cost him his life. After expressing the reverence which we have always had from our earliest youth, for the productions of this admirable composer, we shall transcribe a character of him from "L'Esai sur la Musique," drawn up with elegance, force, and feeling, which does not seem to flow from an exclusive admirer of Rameau, under the guidance of the intolerant preacher of the *triple progression*.

“Leonardo Leo, a Neapolitan, the first master, and most sublime genius for music of his time; who is never mentioned but with respect and admiration by every intelligent professor. They all aver that no compofer has given to music that interefing elevation, that impreffive dignity, which are the principal characteristics of the ftyle of Leo. A noble pathos always reigns in his compositions; his ferious and feeling character has intuitively guided his pen. This has made him partial to the chromatic, which he has fo ably treated. In fpite of the difficulty of compofing in this genus, he joins all the grace and sweetness which are fo delightful, even in the moft natural mufic. His tafte and expreffion will be always celebrated; as all thefe natural gifts were under the guidance of the moft profound knowledge of his art. In fhort, this wonderful man cannot be too highly prifed. His name and works are known to all Europe. He moft delighted in dramatic mufic, which, however, did not prevent him from enriching the church and chamber with innumerable productions of the moft finished kind. The following are fome of his operas: in 1720, *Cajo Gracco*; in 1722, *Tamerlane* and *Bajazet*; in 1723, *Timocrate*; 1728, *Argene*; in 1729, *Catone* and *Utica*; in 1735, *La Clemezza* di Tito; and in 1737, *Siface*. This truly great mufician died about the year 1742, at the age of 53.”

**LEONARDSTOWN**, in *Geography*, a poft-town of America, in the ftate of Maryland, and capital of St. Mary’s county, fituated on the E. fide of Britton’s brook, where it falls into Britton’s bay, five miles from its mouth in the Patowmac; and containing about 50 houfes, a court-houfe and gaol; 217 miles S.W. of Philadelphia. N. lat. 38° 18’.

**LEONBERG**, or **LEONSBURG**, a town of Wurtemberg, on the Glems; 6 miles W. of Stuttgart. N. lat. 48° 51’. E. long. 9° 7’.

**LEONE**, one of the Navigator’s ifles, about five miles in circumference, E. of Fanfoué, from which it is feperated by a channel.

**LEONES**, a fmall ifland in the Atlantic, near the coaft of Patagonia. S. lat. 50° 2’.

**LEONESSA**, a town of Naples, in Abruzzo Ultra; 19 miles N.W. of Aquila.

**LEONFORTE**, one of the largeft and handfomeft towns in Sicily, 10 miles from Argiro: fituated on an eminence. The number of inhabitants amounts to 12,000. The convent of Capuchins is as populous as the town.

**LEONI**, a town of Naples, in Principato Ultra; 12 miles W. of Couza.

**LEONICENUS**, **NICHOLAS**, in *Biography*, an eminent Italian phyfician, was born in one of the Venetian iflates in the year 1428. He was profefor of medicine at Ferrara during upwards of fixty years, and was the firft perfon who undertook to tranflate the works of Galen into Latin. In fact he was fo ftrongly attached to literary purfuits, and to the duties of his profeforfhip, that he gave up little time to the practice of his profefion: and when his negligence in this refpect was condemned, he faid, “I do more fervice to the public, than if I vifited the fick, by inftructing thofe who are to cure them.” He extended his attention alfo to the belles lettres, which he confidered as clofely connected with the proper ftudy of philofophy and medicine; he wrote fome refpectable poetry, and tranflated into Italian the hiftory of Dion Caffius, and the dialogues of Lucian. Until the age of thirty, Leoniceus was tormented with frequent attacks of epilepsy, which reduced him at times to melancholy and deffpair. This difeafe, however, afterwards left him, and, by means of great regularity and temperance,

he attained the age of ninety-fix years, and died in 1524, poffeffed of all his faculties. To one who inquired, with aftonifhment, by what feeret he had preferred this entire poffeffion of his faculties, together with an erect body, and vigorous health, at fo great an age, he replied, that it was the effect of innocence of manners, tranquility of mind, and frugality in diet. The duke and fonate of Ferrara erected a monument to his memory. He left feveral works, moft of which have been feveral times reprinted. “De Plinii et aliorum Medicorum in Medicina cronibus, &c.” Ferrari, 1492. In a pofthumous edition, printed at Bafle, in 1532, fome other opufcula were added, particularly “De Herbis, Fructibus, Animalibus, Metallis, Serpentibus, Tiro feu Viperâ.”—“Liber de Epidemia quam Itali Morbum Gallicum vocant, Galli verò Neapolitanum,” Venice, 1497. In feveral fubfequent editions, the title “De Morbo Gallico” was adopted.—“Præfationes in Libros Galeni a fe tranflatos,” ibid. 1508, folio, with fome other treatifes. “Opus de tribus doctriinis ordinatis fecundum Galeni fententiam,” ibid. 1508, fol. “Libri duo Galeni de curandi ratione ad Glauconem Latine verbi,” Paris, 1514, 4to. “Hippocratis Aphorifmorum Libri VII., Græce et Latine,” ibid. 1526, 8vo. “Converfio et explanatio primi Libri Ariftotelis de partibus Animalium,” Bafle, 1541, 8vo. “Galeni Ars Medica,” Venice, 1606. Eloy Dict. Hift. de Med.

**LEONICO**, **TOMEIO**, **NICHOLAS**, was born in Venice, of an Albanian family, in the year 1456. He ftudied Greek at Florence, and made fuch progrefs, that he became able to explain Ariftotle in the original language. For this purpofe he was invited to Padua in 1497. He was brought up to the church, and taught the learned languages at Venice, but in 1520 he returned to Padua, where he gave inftructions to cardinal Pole. He was much attached to the Platonic philofophy, and paffed his time remote from worldly purfuits, and fofoely intent upon his ftudies. Bembo, Giovio, and others, fpeak of him with great efteem, and Erafmus mentions him with honour, as a man equally refpectable for the purity of his morals and the profundity of his erudition. He died in 1531, and was buried in the church of St. Francis, at Padua. He tranflated feveral of the works of Ariftotle, Proclus’s Commentary on the Timæus of Plato, and other treatifes of the ancient philofophers. He wrote ten dialogues on fubjects philofophical and moral, a work, “De Varia Hiftoria,” and fome Italian poems.

**LEONIDAS** I., king of Sparta, fucceeded to the throne in the year 491, B.C. When Xerxes, king of Perfia, invaded Greece, Leonidas was appointed by the Lacedæmonians to the chief command of their forces to oppofe him. He marched at the head of 4000 men, to take poffeffion of the ftraits of Thermopylæ. Aware of the great danger of the enterprize, he confidered himfelf as one devoted to the fafety of the country. He pofted his fmall army fo fkillfully, that the Perfians, on arriving at the ftraits, found that it would be difficult to force them, and Xerxes endeavoured to bribe the commander to his intereft, by the offer of making him mafter of Greece. The propofal was rejected with indignation, and the monarch immediately fent a herald to order the Grecians to lay down their arms. “Let him come and take them,” was the reply of Leonidas. Thrice the Perfians were repulfed with great lofs; and when a treacherous Greek had led a chofen body of 10,000 Perfians by a feeret paffage to the rear of Leonidas, he was determined to afford a memorable example of what the Greeks could do when called upon to die for their country. Xerxes marched his whole army to the entrance of the ftraits, where Leonidas advanced to meet him. The efforts of valour, heightened

ed by despair, were terrible, and the Spartan king fell amidst a heap of slaughtered enemies. His friends defended his body, till the appearance of the foe in the rear caused the survivors to collect into one close band, facing every way. All these, overpowered by numbers, were left on the field of battle, having amply revenged their fall. The Persian tyrant, enraged at his loss, caused the body of the hero to be nailed to a cross; but the memory of his valour and patriotism could not be obliterated, and the defence of Thermopylae is consecrated among the noblest actions of antiquity. The gratitude of his country raised a splendid monument upon the spot to the fallen, and a funeral oration was for a long time annually pronounced amidst the celebration of martial games, over their tombs.

LEONINE, in *Poetry*, is applied to a kind of verses which rhyme at every hemistich, the middle always chiming to the end.

In this kind of verse we find several ancient hymns, epigrams, prophecies, &c. For instance; Muretus, speaking of the poetry of Lorenzo Gambara of Bresse, says,

“*Brixia vestrates, quæ condunt carmina vates  
Non sunt nostrates tergere digna vates.*”

The following one is from the school of Salernum :

“*Ut vites panam, de potibus incipe cenam.*”

The origin of the word is somewhat obscure : Pasquier derives it from one Leonius, or Leonius, who excelled in this way, and dedicated several pieces to pope Alexander III. ; others derive it from pope Leo; and others, from the beast called *lion*, because it is the loftiest of all verses.

M. Fauchet makes the leonine rhyme the same with what the French call the *rich*, and we the *double rhyme*, i. e. where two syllables have the same orthography, accentuation, and pronunciation, with two others.

LEONOTIS, in *Botany*, so called from λεων, a lion, and οvis, vites, the ear. Lion's-ear. Brown Prodr. Nov. Holl. v. 1. 504. Ait. Hort. Kew. ed. 2. v. 3. 409. (Leonurus; Tourn. t. 87.)—Clas and order, *Didymia Gymnospermia*. Nat. Ord. *Verticillata*, Linn. *Labiata*, Juss. Brown.

Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, oblong, with ten slight ribs, permanent; its orifice unequally toothed, with from six to ten teeth. *Cor.* of one petal, ringent; tube cylindrical, longer than the calyx; upper lip elongated, slightly concave, bearded, undivided; lower much smaller, in three nearly equal segments. *Stam.* Filaments four, concealed by the upper lip, two of them longer than the rest; anthers of two oblong divaricated lobes. *Pist.* Germen superior, four-lobed; style the length and position of the stamens; stigma cloven, acute, its upper segment shortest. *Peric.* none, except the permanent calyx. *Seeds* four, oblong, triangular.

Ef. Ch. Calyx with ten ribs; unequally toothed. Upper lip of the corolla elongated, bearded, undivided; lower much smaller, in three nearly equal segments. Lobes of the anthers divaricated. Upper segment of the stigma shortest.

1. *L. nepetifolia*. Catmint-leaved Lion's-ear. (Phlomis nepetifolia; Linn. Sp. Pl. 820. *Cardiaca americana annua, nepeta folio, floribus brevibus phnicicis villosis*; Herm. Lugd. Bat. 115. t. 117.)—Leaves heart-shaped, pointed. Calyx with eight spinous teeth; the upper one largest. Stem herbaceous.—Native of the East Indies, from whence sir Joseph Banks procured it for Kew garden in 1778. It is a tender annual, kept in the stove, and flowering in September and October. Hermann received the seeds from Suri-

nam; Linnæus from the East Indies, and it flowered in the Urial garden. The whole plant is hoary, with extremely soft minute pubescence. *Stem* four or five feet high, quadrangular, with opposite spreading branches. *Leaves* opposite, two or three inches long, and one or two broad, heart-shaped, veiny, deeply crenate or serrated, pointed, on stalks of their own length. *Flowers* in dense whorls, with linear spinous bractæ, and strongly spinous calyx-teeth. *Corolla* about an inch long, most elegantly clothed with dense scarlet hairs, paler at the edges.

2. *L. Leonurus*. Narrow-leaved Lion's-ear. Lion's-tail. (Phlomis Leonurus; Linn. Sp. Pl. 820. Curt. Mag. t. 478. Leonurus capitis bonæ spei; Breyn. Cent. t. 86.)—Leaves lanceolate. Calyx with ten regular teeth, five smaller than the rest.—Native of the Cape of Good Hope, from whence it was brought into the European gardens, for the sake of its beauty, early in the last century, and is still kept in greenhouses, being propagated by cuttings, and flowering abundantly in autumn. The stem is shrubby, seven or eight feet high. *Leaves* lanceolate, rather narrow, bluntly serrated, about two inches long, of a dull green, roughish, tapering down into short footstalks. *Flowers* large, in dense bracted whorls. *Calyx* downy, its teeth regular, very small, and scarcely spinous; the five alternate ones smaller than the rest. *Corolla* two inches long, slender, incurved, downy, of a fine tawny orange, or somewhat scarlet colour, the lower lip small and brown.

3. *L. Leonitis*. Round-leaved Lion's-ear. (Phlomis Leonitis; Willd. Sp. Pl. v. 3. 128. Ph. Leonotis; Linn. Mant. 83. Leonurus minor, capitis bonæ spei; Mill. Ic. t. 162. t. 1.)—Leaves ovate, blunt, crenate. Calyx with eight awned teeth; the upper one largest. Stem shrubby.—Native of the Cape of Good Hope, from whence it was brought early in the last century, but is less frequent in our greenhouses than the foregoing; from which it differs in its smaller size, roundish long-stalked small leaves, and rather shorter more obtuse corolla, besides the essential distinctions of the calyx.

LEONTARI, in *Geography*, a town of the Morea; 20 miles N.W. of Mifitra.

LEONTESERES, in the *Natural History of the Ancients*, the name of a species of agate, famous in early times for its imaginary virtues in taming the rage of wild beasts, and not a little esteemed among us for its beauty. It is the most variegated of all the agates. Its ground colour is yellow, and its variegations are flame-coloured, white, black, and green.

Sometimes it is one irregular congeries of all these colours, but more frequently it is very beautifully variegated with them in form of clouds and veins; the black and green particularly are usually disposed in concentric circles round one or more points. It is found only in the East Indies, and is very scarce.

LEONTIEVKA, in *Geography*, a town of Russia, in the government of Novgorod; 40 miles S.E. of Valdaï.

LEONTIASIS, in *Medicine*, a name given by the ancients to the elephantiasis, improperly called the Arabian leprosy, from a supposed resemblance of the tuberculated countenance of the patient, in some instances, to the visage of the lion (*leo*). See ELEPHANTIASIS.

LEONTICA, feasts, or sacrifices celebrated among the ancients, in honour of the sun.

They were called *leontica*, and the priests who officiated at them *leones*, because they represented the sun under the figure of a lion radiant, bearing a tiara, and gripping in his two fore-paws the horns of a bull, who struggled with him, in vain, to disengage himself.

The critics are extremely divided about this feast: some will have it anniversary, and to have made its return not in a solar, but in a lunar year; but others hold its return more frequent, and give instances where the period was not above 220 days.

The ceremony was sometimes also called *Mithriaca*; *Mithras* being the name of the sun among the ancient Persians.

There was always a man sacrificed at these feasts, till the time of Hadrian, who prohibited it by a law. Commodus introduced the custom afresh, after whose time it was again exploded.

**LEONTICE**, in *Botany*, a name adopted by Linnaeus from Pliny, as a substitute for *Leontopetalon* of Tournefort. (See **LEONTOPETALON**.) Lion's-leaf. Linn. Gen. 168. Schreb. 223. Willd. Sp. Pl. v. 2. 148. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 272. Sm. Prodr. Fl. Græc. Sibth. v. 1. 234. Juss. 287. Lamarck. Illust. t. 254. —Class and order, *Hexandria Monogynia*. Nat. Ord. *Corydalis*, Linn. *Berberidæ*, Juss.

Gen. Ch. Cal. Perianth inferior, of six linear, spreading deciduous leaves, the intermediate ones smaller. Cor. Petals six, ovate, acute, twice as long as the calyx. Nectary of six half-ovate, spreading, equal, stalked scales, inserted into the base of the petals. Stam. Filaments fix, thread-shaped, very short, opposite to the petals; anthers erect, of two cells, and two valves, bursting from the base upwards. *Pist.* Germen superior, oblong-ovate; style short, nearly cylindrical, inserted obliquely upon the germen; stigma simple. *Peric.* Berry hollow, inflated, globose with a point, of one cell, but slightly succulent. *Seeds* few, globose.

Eff. Ch. Corolla of six petals. Nectary of six spreading stalked leaves, attached to the base of the petals. Calyx of six leaves, deciduous. Berry inflated, of one cell. *Seeds* few, globose.

1. *L. Chryfogonum*. Pinnated Lion's-leaf. Linn. Sp. Pl. 447. (*Leontopetalon* affinis, foliis quernis; Moris. v. 2. 285. fect. 3. t. 15. f. 7. *Chryfogonum* Diofcoridis; Rauw. It. t. 119. *Chryfogono* di Diofcorido; P. Bald. 141.)—Leaves radical, pinnated, deeply cut.—Native of corn-fields in Greece. Dr. Sibthorp gathered this species near Abydos. It is much to be regretted that so curious a plant, though cultivated by Miller, is now a stranger to our gardens, and that even dried specimens are so very rare. Whether it be really the *χρυσογόνος* of Diofcorides, his short description must ever leave doubtful. The leaves are not much like an oak, nor the flower like a Mullein, though the tuberous root may be compared to a turnip. He describes his as very red within. Authors represent our's as having a perennial, fleshy, somewhat conical root, producing several upright stalked leaves; there are about a span long, smooth, rather glaucous, simply pinnate; the leaflets not quite opposite, about nine or ten pair, sessile, oblong or roundish, either wedge-shaped or in some degree heart-shaped at the base, entire at the sides, but more or less deeply cut towards the top. In our specimens they are by no means so deeply divided as in the figures above quoted, which have led professor Willdenow to suppose them whorled. *Flower-stalks* one or two, radical, a little taller than the leaves, many-flowered, branched, corymbose, round, smooth, leafless. *Bractææ* elliptical, coloured, solitary at the base of each branch. *Flowers* yellow, somewhat like those of *Celandine*. *Anthers* ovate before they burst.

2. *L. Leontopetalum*. Common Lion's-leaf. Linn. Sp. Pl. 448. (*Leontopetalon*; Camer. Epit. 565. Ger. om. 236. Barrel. Ic. t. 1029, 1030. Moris. v. 2. fect. 3. t. 15.

f. 6.)—Radical leaves twice or thrice ternate; stem-leaves ternate.—Abundant in corn-fields in the Levant, flowering early in the spring, and ripening fruit in May. Gerard says, lord Zouch in his time brought a plant from Italy, but, as far as he knew, it perished. Miller, however, appears to have raised both this and the preceding from seed, but could not preserve them, on account of the unfavourable spring so usual here. *Root* tuberous, perennial. *Stem* solitary, erect, 12 or 18 inches high, branched, smooth, leafy. *Radical leaves* somewhat like those of a Columbine, on long stalks, twice or thrice ternate, the leaflets rounded or obtuse, entire, confluent or decurrent, veiny; those of the stem much smaller, and scarcely more than simply ternate. *Flower-stalks* corymbose, soon racemose, with ovate concave bractææ. *Flowers* yellow, copious, much like the last. *Fruit* an inch long, more or less ovate, soon becoming a dry, membranous, curiously reticulated bag, in the bottom of which are three or four large round seeds. The *Leontice incerta* of Pallas, in his Travels, v. 3. 726. t. V. f. 3, which Willdenow has adopted by the name of *L. vesicaria*, seems a mere variety, differing a little, as is perhaps usual, in the shape of the fruit, but otherwise agreeing exactly with the *Leontopetalum*. Pallas was in doubt respecting it, as having seen nothing of the flowers.

3. *L. altaica*. Fingered Lion's-leaf. Willd. n. 4. Pallas. Act. Petrop. for 1779. 257. t. 8. f. 1—3. Willd. Lamarck. f. 2.—Radical leaves twice compound; stem-leaves fingered, oblong.—Discovered by Pallas on exposed parts of the Altay mountains. We have never seen this species, but Willdenow, who examined a dry specimen, says, “the radical leaves have their stalk first three-cleft, and that each division bears five elliptic-lanceolate, entire leaflets at its summit; the stem-leaves are in like manner quinate, generally three together in a whorl. *Bractææ* elliptical, obtuse.” This latter part of the description accords with Lamarck's figure, copied, we presume, from Pallas.

4. *L. thalicroides*. Columbine-leaved Lion's-leaf. Linn. Sp. Pl. 448. (*Carophyllum thalicroides*; Michaux Boreali-Amer. v. 1. 205. t. 21.)—Stem-leaves twice or thrice ternate; terminal leaflets three-lobed, acute.—Native of North America. It was procured from thence by Peter Collinson before 1755, and is still preserved in some curious gardens, flowering in May. *Root* perennial. *Stem* a foot high or more, erect, simple, bearing one thrice compound leaf; and another, close to the flowers, twice compound, both sessile, but with long partial stalks; leaflets dark green above, glaucous beneath, rounded at the base, with two or three deep acute segments at their fore part; as the fruit advances they become more rounded and much enlarged, resembling some large kind of Meadow-rue, or Columbine. *Flowers* green, in a small, slightly compound, slender, stalked cluster, with little ovate acute bractææ. The whole plant is smooth. Michaux describes the fruit as more pulpy than in the above species, and single-seeded, like the drupa of the sloe, but this is hardly sufficient perhaps to establish, as he does, a new genus. We find the berry hollow, and apparently somewhat inflated, though far less than in the second species. American botanists must solve this difficulty.

5. *L. triphylla*. Three-leaved Lion's leaf.—Leaves radical, ternate, bluntly toothed. Stalk radical, simple. Flowers spiked.—Gathered by Mr. Archibald Menzies, on the west coast of North America. The root is perennial, somewhat creeping. *Leaves* solitary, on a slender, simple, upright, smooth footstalk, about ten or twelve inches high, with a few imbricated, elliptical, concave, ribbed scales at its base; leaflets three, sessile, two inches wide, smooth, pale green, beautifully reticulated with innumerable veins; ra-

ther wedge-shaped at their base, the side-ones dilated laterally; the outer margin of all wavy or bluntly toothed. *Flower-stalk* solitary, from the same bud with the leaf, but a little taller, simple, slender, naked. *Spike* terminal, about an inch long, of numerous, sessile, white *flowers*, of whose *calyx* or *corolla* we can find no traces, but the *filaments* agree so well with those of *L. Leontopetalum*, in their very peculiar structure, that we venture to refer our plant to this genus. The *filaments* are extremely slender at their base; the *germen* is ovate, with a thick, nearly sessile, oblique *stigma*.

LEONTICE is also a plant mentioned by the ancient Greeks, and called by them *caecalia*.

Dioscorides tells us it had these names in common, and that it was of great virtue in curing diseases of the *aspera arteria*, or wind-pipe.

This medicinal plant of the Greeks was very different from that we now call *caecalia*. Some have described it to have flowers like the oak, others like the olive-tree, but the old manuscripts of Dioscorides all say, the flowers were like those of bryony. Hence it could by no means be the *caecalia* of the moderns; nor is it easy to say, from such short and uncertain accounts, what it was. See the preceding article.

LEONTINI, or LEONTIUM, in *Ancient Geography*, a town of Sicily, called also, as Diodorus informs us, *Xutibia*, a name given probably to the small district in which it is situated. It was situated, according to Herodotus's account of it, between two rivers, which, after their junction, ran into the southern part of the gulf of Catania. One to the S. was called "Lisius," now Liso, and the other to the N. "Terias," called St. Leonard's stream. The town was built, at the same time with Catania, by the Chalcidians, under the conduct of Theocles, the Athenian, in the 11th year of the 13th Olympiad, as we are informed by Thucydides; in whose time it was defended by two strong citadels, one called the citadel of Phoece, the other the citadel of Bricinnia. The adjacent territory was so fruitful, that it yielded, according to Pliny, crops of corn an hundred fold, and Cicero calls it the grand magazine of Sicily. Its wines were the most delicious of the whole island, but the inhabitants perverted the benefit into an occasion of intemperance, so that it became a proverbial saying, "the people of Leontini are always at their cups." Leontium had its tyrants as well as Syracuse, and between these two cities there subsisted a constant rivalry and enmity. This was the birth-place of the celebrated rhetorician Gorgias, whose eloquence astonished even the Athenians, and who persuaded them to undertake the unfortunate expedition under Nicias. Leontium at length fell under the power of Syracuse, Dionysius the tyrant having removed the inhabitants thither. The situation of the castle, and the fertility of the country, rendered Leontium at all times a place of importance to the different nations which possessed Sicily. The earthquake of 1693 completed its destruction, and reduced it to its present state of wretchedness. The ancient city, built on four hills, presents to the observer nothing but a spot of ground torn by four ravines, which lay open a few wretched grottos, the sole remains of its former greatness. The castle stood on a detached rock, opposite to the city, which was originally hewn out of it, and has been successively built and rebuilt according to the style of different ages, and the prevailing modes of besieging and defending places. The rich country of Leontium, so luxuriant in corn, is now called the plain of Catania; it is 12 miles wide by 20 in length, and was formerly the country of the *Lætrigons*, divided and bathed by the "Simaethus," the largest river in Sicily, which rolls along in its stream a quantity of black

and yellow amber, which is sought for where it disgorges itself into the sea, and is washed up at Catania.

LEONTIUM, in *Biography*, an Athenian courtesan, at one time noted for the licentiousness of her life, and afterwards distinguished by her application to the study of the Epicurean philosophy. It has been asserted, that she did not desert from her intrigues after she was an attendant on Epicurus, but prostituted herself to the disciples of his school, and even to the philosopher himself. She became the wife of Metrodorus, one of the principal disciples of Epicurus, and had a son by him, whom Epicurus commended to the notice and regard of his executors. Leontium applied with great diligence to the study of philosophy, and wrote, in defence of the Epicurean doctrines, against Theophrastus, one of the principal of the Peripatetic sect. The book is acknowledged by Cicero to have been written in a polite and elegant style. Bayle. Moreri.

LEONTIUS, surnamed the *Sebolastic*, who flourished in the sixth century, was a native of Constantinople, was educated an advocate and afterwards became a monk. He lived till about the close of the century. The principal work of Leontius is "A Treatise on the Sects of Heretics," divided into ten discourses. It was published in Greek and Latin at Basil, in 1578. He was also author of various treatises against the Eutyrians, Nestorians, and Apollinarists; a discourse on the festival celebrated between Easter and Whit Sunday; and there are "Orations" and "Homilies" ascribed to him in the Bodleian and Vienna libraries. Moreri.

LEONTODERON, in *Natural History*, a name given by several authors to a species of agate, of a plain yellowish colour, without variegations.

LEONTODON, in *Botany*, derived from *λεων*, *λεω*'s, a lion, and *δον*, a tooth, and so called from a similarity in the shape of its jagged leaves to the teeth of a lion. Linnæus bestowed this name upon the genus in just preference to the compound one of *Dens Leonis* given by Tournefort. The English name *Dandelion*, which is a corruption of *Dent de Lion*, is expressive of the same idea, and might possibly have given rise to its botanical appellation. Dr. Smith has described the leaves of *Leontodon Taraxacum*, in his Introduction to Botany, p. 157, as runcinate or lion-toothed, cut into several traverse, acute segments, pointing backwards. A striking character of this sort, which, at first sight, suggests a name, borrowed from some familiar or popular resemblance, is always desirable, and is sufficiently apparent in this genus.—Linn. Gen. Coll. Schreb. 529. Willd. Sp. Pl. v. 3. 1544. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. v. 2. 822. Ait. Hort. Kew. v. 3. 120. Gaertn. t. 158. (Dens Leonis; Tournef. t. 266. Taraxacum; Juli. 169. Lamarck. Illust. t. 653.)—Class and order, *Synonymia Polygamia Æqualis*. Nat. Ord. *Compositæ Semibisulculosa*, Linn. *Ciboraceæ*, Juss.

Gen. Ch. *Common calyx* imbricated, oblong; its interior scales linear, parallel, equal; outer scales fewer in number, often reflexed at the base. *Cor.* compound, imbricated, uniform; the florets hermaphrodite, numerous, equal, each of one petal. ligulate, linear, abrupt, with five teeth. *Stam.* Filaments five, capillary, very short; anthers united into a cylindrical tube. *Pist.* Germen nearly ovate; style thread-shaped, as long as the florets; stigma two, revolute. *Peric.* none, except the oblong, straight, at length reflexed, calyx. *Seeds* solitary, oblong, rough; down capillary, stipitate. *Recept.* naked, dotted.

Ed. Ch. Receptacle naked. Calyx double, imbricated with rather lax scales. Down stalked, hairy.

1. *L. Taraxacum*. Common Dandelion. Linn. Sp. Pl.

1722. Engl. Bot. t. 510. Curt. Lond. fasc. 1. t. 58. —Outer scales of the calyx reflexed. Leaves lion-toothed, smooth. Perhaps the most common of all plants, in meadows, pastures, on rubbish and on all cultivated land, flowering from April to July. This troublesome though handsome weed, has a deep and branching perennial root. Leaves radical, runcinate, toothed, of a bright green colour, smooth. Flower-stalks simple, longer than the leaves, hollow, brittle, milky and single-flowered. Flower terminal, large, golden-coloured, closing in the evening. Styles hairy. Seeds obovate, furrowed, bearing on a long footstalk a tuft of simple, radiated down. The diuretic qualities of this plant, which caused it to be called *Pissinli* in French, procured it a similarly expressive name in this country, by which it is well known to the vulgar. The whole herb is milky and bitter, but like Lettuce or Celery becomes sweet by culture or blanching. Curtis remarks that the French are very partial to this species in their salads. It is especially used by the poorer sort of people, because it is so common and so easily prepared.

2. *L. palustris* Marsh Dandelion. Sm. Fl. Brit. 823. Lyons Fasc. 48. Engl. Bot. t. 553. (*L. lividus*; Willd. n. 3.) —Outer scales of the calyx shorter, upright, ovate. Leaves finned and toothed, nearly smooth. Found generally on moors and marshes. At Hinton Moor, in Cambridgeshire, by the Rev. Mr. Relhan, and at Heydon, Norfolk, by the Rev. Mr. Bryant. It flowers in June and July. Root perennial, spindle-shaped. Leaves not quite so distinctly lion-toothed as in *Taraxacum*, sometimes inclined to be hairy. Flower-stalks about as long as the leaves, sometimes decumbent. Calyx imbricated on all sides; its scales gradually smaller outwards, ovate, acute, all erect. Florets golden-coloured, the outer ones purplish at their back. Seeds and Down very similar to the former species. Indeed this was considered merely as a variety of that, till Dr. Smith established the present plant in his English Botany. The whole herbage is more delicate and slender than that of the common Dandelion.

3. *L. serotinus* Late-flowering Dandelion. Walldt. and Kitaib. Pl. Rar. Hung. v. 2. 119. t. 114. Willd. —Outer calyx spreading. Stalk single-flowered. Leaves runcinate rough, their teeth rounded and notched. A native of hills in Hungary. —Flower-stalk generally smooth, sometimes downy. The species is sufficiently marked as being distinct from *L. Taraxacum*, to which it is nearly allied in habit, from having the scales of its calyx spreading and sticking out in all directions; its leaves are also rough, their lobes rounded and toothed.

4. *L. levigatus* Smooth Dandelion. Willd. n. 4. —Outer calyx erect, close-pressed; scales ovate. Stalk single-flowered. Leaves deeply runcinate, toothed, smooth. A native of Spain. Radical leaves deeply runcinate, almost pinnatifid, very smooth and thin; teeth triangular, notched. Flower-stalks smooth, ascending. Scales of the outer calyx ovate, closely-pressed. It differs abundantly from *L. palustris* in having its leaves more slender, and deeply cut, with triangular notches.

5. *L. obovatus* Obovate Dandelion. Willd. n. 5. —Outer calyx spreading; scales ovate. Stalks single-flowered. Leaves obovate, rather obtuse, toothed. Found, like the last, in Spain. Leaves obovate, generally very obtuse, sometimes rather acute, toothed at the margin, smooth; their footstalks and mid-rib sometimes fringed. Calyx furnished with external, acute, spreading scales. This is decidedly distinguished from all the other species by the shape of its leaves.

This genus is much more ample as it stands in Linnæus. We have adopted all the species retained by Willdenow, who has removed the rest to different genera, as follows. *Leontodon bulbosus*, and *aureus*, are referred to *Hieracium*: *L. hiftilis*, *tuberosus*, *autumnalis*, *alpinus* and *bispitosus* to *Aparagia* of Schreber: *L. hirtus* to *Thrinicia* of Roth., and has followed Swartz in calling *L. tomentosus*, *Tufflago albicans*. We do not scruple following Willdenow in reforming the genus of *Leontodon*, especially as we have the authority of Jacquin and Smith for having done so in *Tragopogon*.

LEONTODON *Taraxacum*, or *Common Dandelion*, in the *Materia Medica*, &c. The young leaves of this plant in a blanched state have the taste of endive, and make an excellent addition to those plants eaten early in the spring as salads. At Gottingen the roots are roasted and substituted for coffee by the poorer inhabitants; who find that an infusion prepared in this way can hardly be distinguished from that of the coffee-berry. Dandelion is generally considered by medical writers as the most active and efficacious of the lacteic plants; the expressed juice is somewhat acrid, the root still more bitter, and possessing more medicinal power than any other part of the plant. *Taraxacum* has been long in repute as a mild detergent and aperient, and its diuretic effects may be inferred from the vulgar name it bears in most of the European languages, "quali lectingima et urinaria herba dicitur." Bergius recommends its use in obstructions of the liver, hypochondrials, and jaundice. We have various proofs of the good effects of the *Taraxacum* related by different authors, in jaundice, dropsy, pulmonary tubercles, and some cutaneous disorders. The leaves, roots, flower-stalks, and juice of dandelion have all been separately employed for medical purposes, and seem to differ rather in degree of strength than in any essential property; therefore the expressed juice, or a strong decoction of the roots, has been most commonly prescribed, from one ounce to four, two or three times a day. The plant should be always used fresh; for even extracts prepared from it appear to lose much of their power by keeping. Woodv. Med. Bot.

LEONTODONTOIDES, in *Botany*. See HYOSERIS.

LEONTOPETALO AFFINIS. See LEONTICE.

LEONTOPETALOIDES, the name of a genus of plants described by Dr. Amman, being a species of the *leontice* of Linnæus; which see. See also TACCA.

LEONTOPETALON, from λέων, *leōn*, a lion, and πτελον, a leaf. Lion's-leaf. Tourn. Cor. 49. t. 484. See LEONTICE.

LEONTOPODIUM, from λέων, a lion, and πους, *poūs*, the foot, has been applied as a name to several plants, whose thick and soft hairiness, enveloping their flowers or stalks, as the claws of a lion are enveloped, seems to have given rise to the idea. Among these are *Myosotis scorpioides*; several species of *Gnaphalium*, especially the elegant *Filago Leontopodium* of Linnæus, now restored by Willdenow, very justly, to *Gnaphalium*, where Linnæus at first placed it; *Alchemilla vulgaris*, called *Leontopodium* by Brunfelsius, v. 2. 53; and *Plantago cretica*, the *Leontopodium* of Clusius. What Dioscorides, the father of the name, intended by his *λεοντοπιδιον*, is very difficult to be guessed. Dr. Sibthorp thought it might be *Microtus creticus*, which is very common in Cyprus and several of the Greek islands; but it hardly answers to the description.

LEONTOPOLIS, or LEONTON, in *Ancient Geography*, a town of Egypt, and capital of a nome, which took the name of "Leontopolites nomos." Ptolemy.

LEONURUS,

**LEONURUS**, from *λεων*, a lion, and *ουρα*, a tail; a name given by Tournefort to some Linnaean species of *Phlomis*, (see *LEONOTIS*), but applied by Linnaeus to the *Cardiaca* of Tournefort, for which it is now retained. Motherwort.—Linn. Gen. 205. Schreb. 391. Willd. Sp. Pl. v. 3. 114. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 405. Sm. Fl. Brit. 637. Brown Prod. Nov. Holl. v. 1. 504. Juss. Fl. 14. Lamarck. Illustr. t. 509. (Cardiaca; Tourn. t. 87)—Clafs and order, *Didymium Gymnospermia*. Nat. Ord. *Verticillata*, Linn. *Labiata*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, with five angles, and five awl-shaped, spinous teeth, permanent. Cor. of one petal, ringed; tube narrow; limb gaping; throat long; upper lip longest, semicylindrical, concave, gibbous, fluggly, rounded and obtuse at the top, undivided; lower reflexed, in three deep segments, not quite equal. Stam. Filaments four, concealed under the upper lip, two of them shorter than the others; anthers oblong, incumbent, their lobes parallel, and near to each other, besprinkled with minute, globular, shining, elevated granulations. Pist. Germen superior, four-cleft; style thread-shaped, the length and situation of the stamens; stigma in two equal acute segments. Peric. none, the permanent calyx containing the seeds in its cavity. Seeds four, oblong, convex on one side, angular at the other.

Eff. Ch. Calyx with five teeth, pentagonal. Upper lip of the corolla concave, hairy, undivided; lower in three deep, rather unequal, segments. Anthers with parallel lobes. Stigma equally divided.

1. *L. crispus*. Cut-leaved Motherwort, Murray in Linn. Syst. Veg. ed. 14. 538. Nov. Comm. Goett. v. 8. 44. t. 4.—Leaves with three or five lobes, deeply toothed, rugged and wavy. Corolla longer than the calyx.—Native of Siberia. Said to have been cultivated in the Oxford garden in 1658. It has all the appearance of being a luxurious or monitrous variety of the following.

2. *L. Cardiaca*. Common Motherwort. Linn. Sp. Pl. 817. Engl. Bot. t. 286. Fl. Dan. t. 727. (Cardiaca; Ger. em. 705. Camer. Epit. 864. Rivin. Monop. Irr. t. 20. f. 1.)—Upper leaves lanceolate; three-lobed or undivided. Corolla longer than the calyx; the middle lobe of its under lip acute.—Native of waite ground in the more northern parts of Europe, not frequent in England. It loves a gravelly or calcareous soil, and is perennial, flowering in July and August. The herb is bitter, with a pungent unpleasant smell. Stem a yard high, purplish, square, regularly beset with numerous, opposite, stalked, roughish, dark-green leaves; of which the lower are broadest, three-lobed, and more or less deeply cut; the upper gradually narrower and less divided, till they become lanceolate, acute, and quite entire. Flowers numerous, in dense whorls. Bractees awl-shaped, pungent. Calyx-teeth spreading, rigid, nearly equal, broad at the base. Corolla purple, variegated; its upper lip elegantly villous with white hairs. The anthers are marked with shining points, but that is not peculiar to the genus.

3. *L. Marrubialtrum*. Small-flowered Motherwort. Linn. Sp. Pl. 817. Ehrh. Pl. Exicc. n. 157. Jacq. Austr. t. 405.—Leaves ovato-lanceolate, strongly serrated. Corolla scarcely longer than the calyx; the middle lobe of its under lip rounded, obtuse.—Native of Bohemia, Germany, Tartary and Siberia. The leaves vary in breadth, and are either strongly serrated or entire, but never cut or jagged like the preceding. The calyx-teeth also are narrower and longer; and the corolla totally different, scarcely exceeding the length of the calyx, but slightly downy, and the middle lobe of its under lip almost heart-shaped, or at least dilated

and very blunt. The roots moreover is said to be only annual, or biennial. The plant has little to excite notice, and is only kept in curious gardens.

4. *L. supinus*. Decumbent Motherwort. Willd. n. 5.—“Leaves mostly five-lobed; the lobes obtuse, toothed at the summit. Calyx sessile. Stems ascending.”—Native of Siberia, communicated to professor Willdenow by his friend Stephan. “Root perennial. Stems several, half a foot high, ascending, branched, square, downy. Leaves opposite, half an inch long, with three or five lobes, which are oblong, somewhat wedge-shaped and obtuse, furnished at the extremity with three or five obtuse teeth; downy on both sides, especially the under. Footstalks the length of the leaves. Whorls of four to six flowers, sessile. Bractees bristle-shaped, pointed, downy, shorter than the calyx. Calyx downy, its segments ovate, spinous. Corolla white, rather longer than the calyx, its lip three-lobed, obtuse.” Such is Willdenow’s description, made from the dried plant, which in almost every minute particular accords so well with our *Lamium palmatum*, (see *LAMNUM*), that we should conclude them to be the same, were it not for the bractees, of which our plant is certainly destitute.

5. *L. tataricus*. Tartarian Motherwort. Linn. Sp. Pl. 818. (Cardiaca foliis tenuiis et profundius incisfis glabra; Mill. Ic. v. 1. 53. t. 8c.)—Leaves in three deep divisions; their lobes jagged. Upper lip of the corolla flattened, upright, reflexed.—Native of Tartary. It differs from the following merely in the flower being smaller, with a more rounded upper lip, whose extremity is reflexed. Gmelin, who gathered both, thought them varieties, and we find no difference to be depended on.

6. *L. fibrificus*. Siberian Motherwort. Linn. Sp. Pl. 818. Sm. Exot. Bot. t. 94. (Ballote inodora, foliis coronopi; Amm. Ruth. 48. t. 8.)—Leaves in three deep divisions; their lobes jagged, bluntish. Upper lip of the corolla straight.—Native of Siberia, China, and the East Indies, a hardy annual in our gardens. Stem two or three feet high, branched. Leaves deeply cut in a three-fold manner, into various deep divisions, mostly narrow and bluntish, more or less downy. Flowers crimson, in dense whorls, with awl-shaped bractees. Calyx silky. Corolla twice as long as the calyx; its upper lip concave, but straight; lower in three lobes, the middle one dilated, heart-shaped. Mr. Sowerby found a double row of crimson glands in the mouth of the tube. The calyx is often spinous, but not always so.

For the *L. Galeobdolon* of Willdenow; see *GALEOBDELON*. **LEOPARD**, in Zoology, the English name of the long-tailed *felis*, or *FELIS pardus* of Linnaus; which see.

**LEOPARD’S PANE**, in Botany. See *DORONICUM*.

**LEOPOLD I.**, in Biography, emperor of Germany, son of Ferdinand III. was born in 1640. He was elected king of Bohemia in 1654, and of Hungary in 1655, and he succeeded to the imperial crown in July 1658. His reign was fruitful of important events. A war with the Turks, which broke out in 1661, was brought to a conclusion in 1664, in consequence of a victory obtained over the grand visier, at St. Gotthard, in Hungary. This was succeeded by a revolt of the Hungarians, excited by those infringements of their privileges which have been continually renewed under the princes of the house of Austria. The execution of the leaders in 1671, for a time, quelled the disorders, without removing the causes of discontent. In 1672 Leopold joined in a league with other powers to protect the Dutch against Lewis XIV.; at this crisis the Hungarian malecontents took the opportunity of shaking off the Austrian yoke and asserting

asserting their original independence. Headed by count Tekeli, and supported by the Turks, they again rose in arms, and obtained various successes against the Imperialists. In 1682 a new war broke out between the empire and France; and about the same time the breach of a truce by the Hungarian revolters, and the irruption of a vast Turkish army, reduced Leopold to the greatest danger. His general, the duke of Lorraine, was obliged to retire under the walls of Vienna, and the grand vizier laid siege to that capital, while the emperor with his court withdrew to Linz. A series of successes afterwards attended the imperial arms in Hungary, and all that had been lost was gradually recovered. The rebels were tried, the noblest blood was shed without mercy or remorse, and the Hungarians were so far humiliated, that an assembly of the estates, in 1687, declared the kingdom hereditary in the house of Austria, and elected for their king the archduke Joseph, then only nine years of age. Three years afterwards, Leopold procured the election of his son Joseph to the succession of the empire, as king of the Romans. The war with France was carried on with various success, till the general peace, concluded at Ryswick, in 1697. In 1699 a long truce was agreed on between the German and Turkish empires, on terms favourable to Leopold, whose arms had obtained great glory under the illustrious prince Eugene. The war, on account of the Spanish succession, plunged Europe again in blood. Leopold gained over the elector of Brandenburg to the party of the allies, by consenting to recognize him as king of Prussia. The events of the war were at first unfavourable to the emperor, but the decisive battle of Blenheim or Hochstet, in 1704, changed the face of affairs. Leopold did not long enjoy the brighter prospect which was opening upon him: he died in the following May, at the age of sixty-five, after a reign of forty-six years, leaving the power of his house much augmented in his hands. "His original education," says the historian, "which was that of an ecclesiastic, had coincided with his natural disposition, in producing a cold formality of character; and the narrowness of his ideas threw him into the power of favourites, whom his jealousy of authority led him frequently to change. The great objects of his policy were, however, pursued with a steadiness which ensured their final success." *Modern Univer. Hist.*

LEOPOLD II., emperor of Germany, born in 1747, son of the emperor Francis I. and the empress-queen Maria Theresa, was created grand duke of Tuscany about the year 1765; and during a reign of twenty-five years, displayed a constant regard and attention to the happiness and prosperity of his people. He carried into effect a number of improvements relative to all the branches of administration, which rendered that portion of Italy peculiarly flourishing. He diminished the taxes, and yet augmented the revenue; introduced an exact police; encouraged the arts, manufactures, and agriculture; freed industry from the fetters of numerous festivals, meliorated the condition of the public hospitals and prisons, and promulgated an entire new code of laws, characterized as well by their humanity as their simplicity. In the preface to this code he says, "We have considered the examination and reform of the criminal laws as one of our principal duties;" and after much experience he says with true patriotic exultation; "With the utmost satisfaction to our paternal feelings we have at length perceived, that the mitigation of punishments, joined to a most scrupulous attention to prevent crimes, and also a great dispatch in the trials, together with the suddenness of punishment to real delinquents, has, instead of increasing the number of crimes, considerably diminished that of the smaller ones, and rendered those of an atrocious nature very rare;" so rare, in-

deed, that during ten years not a single execution took place in his dominions. Leopold protected the lower ranks from the oppression of the higher, and his palace was ever accessible to the meanest supplicant. Though the father of his people, he was also their master, and would admit of no opposition to his will; though sincerely desirous of doing good, he was cold and saturnine. In 1790 the imperial crown, and the succession to the Austrian dominions, devolved to him on the death of his brother Joseph. The result of that unfortunate prince's schemes had been an absolute revolt of the Low Countries, the disaffection of Hungary, and the jealousy of all the surrounding states. Leopold, by employing the arts of conciliation, in conjunction with firmness and prudence, was able in a short time to recover the Low Countries, to quell the opposition of the Hungarian malcontents, to strengthen his house by splendid alliances, and to establish peace with the Ottoman Porte. He restored a good understanding between the courts of Vienna and Berlin, and concurred with England in checking the ambitious projects of Russia. Soon after the commencement of the French revolution, Leopold formed, at the congress of Pillnitz, a coalition with Prussia, for the avowed purpose of giving a government to France, and the subsequent invasion of that country by the united forces of the two powers is to be regarded as a consequence of this alliance. Leopold did not live long enough to witness the commencement of hostilities. He died in the month of March 1792, at the age of forty-four, leaving behind him a numerous progeny, of whom his eldest son Francis II. succeeded to the vacant throne. *Univer. Hist. New Ann. Regit. Edict of the grand duke of Tuscany, printed by the celebrated Mr. John Howard.*

Leopold was passionately fond of Italian poetry and music, and is said by Quadrio (*Storia d'Ogni Poesia, vol. i.*) not only to have been the constant patron of both, but to have composed masses and motets for his own chapel, and to have written, and set to music, himself, many beautiful canzonets and madrigals. This prince, early in his reign, retained in his service the Italian lyric poet Minato, and Antonio Draghi, to write and set operas for the imperial court at Vienna.

LEOPOLDSTADT, in *Geography*, one of the suburbs of Vienna, large and populous; situated on the N. side of the Danube, and communicating with the city by a bridge.

—Also, a fortified town of Hungary, on the river Waag; 56 miles E. of Vienna. N. lat. 48 28'. E. long. 17 54'.

LEOSTENIUS SINUS, in *Ancient Geography*, a gulf of Thrace, upon the Thracian Bosphorus, towards the northern part of the Hermean promontory.

LEOTAUD, VINCENT, in *Biography*, a French Jesuit, and able mathematician, was born at Laval-Louville, in the diocese of Embrun, and died in the year 1672. He published a work on the quadrature of the circle; "Arithmetical Institutions, in four books;" a treatise "On Cyclo-metry;" a work "On Magnetology," and a work "On the Primum Mobile."

LEOTIA, in *Botany*, perhaps so called from *λεως*, or *λαος*; the people, or *vulgar*; yet it does not appear to be either a common genus of fungi, nor vulgarly used as food, like many others. Its aspect indeed is ordinary enough, being that of a small Agaric without gills. *Perfoon. Syn. Fung. 611. Obs. Mycolog. v. 2. 21. t. 5. f. 1. 1. 6. f. 1. 2.*—Clafs and order, *Cryptogamia Fungi. Nat. Ord. Fungi.*

—Elt. Ch. Head roundish, reflexed at the margin and closely embracing the stalk, bearing seeds in its exposed surface.

The species enumerated by Perfoon are nine, four of which

which have a smooth conical or ovate head, three an orbicular one, and the other two arc esteemed doubtful.

Among the first is *L. Mitula*, the *Elvele acullata* of Batsch, f. 132, and probably *Clavaria ferruginea* of Sowerby's Fungi, t. 84; found in autumn growing copiously on decayed leaves of Scotch fir. The stalk is near an inch high. Head conical or ovate, of a pale cinnamon colour; white and spongy within.

In the second section is *L. lubrica*, (*Helvella gelatinosa*; Bulliard 296. t. 473. f. 2.) ; not unfrequent, after much rain, in beech woods. It is of a light greenish buff colour, and tender substance. Stalk two or three inches high, hollow, tumid in the lower part; and the cavity is continued into the head, which is rounded, depressed, undulated, and obscurely lobed, about an inch in diameter, composed as it were of two coats, with a hollow space between.

*Helvella Relbani*, Sowerby t. 11, is one of the doubtful species.

LEOVILLE, in *Geography*, a town of France, in the department of the Lower Charente; eight miles N. of Montlieu.

LEOWITZ, CYPRIAN, in *Biography*, a celebrated astronomer in the sixteenth century, was born in Bohemia, and was appointed mathematician to Otho Henry, elector palatine. He acquired a high reputation by his astronomical productions, of which the principal were "Ephemerides ab anno 1556, ad Ann. 1606;" "Expedita Ratio constituendi Thematæ celestis;" "Loca stellarum fixarum ab anno Dom. 1549, usque in Ann. 2029;" and "De Eclipsibus Liber." His celebrity occasioned Tycho Brahe to pay him a visit in the year 1569, when they had several conversations on their favourite subjects. Notwithstanding the great learning of Leowitz, he was weak enough to become the dupe of judicial astrology. He died in Swabia in 1574. He had predicted that the world would come to an end in 1584, and of this prophecy many priests and preachers took advantage as the important period approached, and enriched themselves at the expence of the fears of their people. Bayle. Moreti.

LEPA, in our *Old Writers*, a measure which contained the third part of two bushels. Whence we derive a *feed leap*.

LEPANTO, in *Geography*, a sea-port town of European Turkey, in the province of Livadia, situated in a bay formerly called the "gulf of Corinth," now the "gulf of Lepanto." This town is fortified and defended by a castle on an eminence. N. lat. 38 37'. E. long. 22 0'.

LEPAS, in *Conchology*, a genus of the multivalve order, the animal of which, according to the Linnæan system, is a triton, the shell affixed at the base, and consisting of many unequal erect valves. This genus, as defined by Linnæus and Gmelin, comprehends two very distinct genera, the union of which, under one title, is liable to much objection; though, for the sake of uniformity, we are not inclined in this article to separate them. One of these natural tribes, for example, has the shell of a conic form more or less tubular, the base firmly affixed upon rocks or other extraneous substances, without any tendinous tube; the shell is composed of six valves; and the truncated opening above is closed by a four-valved operculum. In the other genus the shell, instead of being conic, is broad, flattish and wedge-formed, and in many species resembling, in some degree, the spear or head of an arrow; it is besides composed, in general, of a much greater number of plates or valves, the aperture of which is lateral instead of being at the summit, and has no operculum; and lastly, the shell is not affixed by its testaceous base, but is placed at the extremity of a tendinous tube, the base of which unites it to the rocks or other substances to which, for convenience and security, the animal connects it-

self. The very obvious dissimilarity that prevails between these two genera attracted the particular attention of early writers, even before the time of our own countrymen Lüsler and Petiver, the term *Balanus* being adopted for the former, and *Concha anatifera* for the latter, and by these names the two tribes of shells are recognized in the writings of Gesner, Aldrovandus, and others. Linnæus, notwithstanding these authorities, however, consolidated them together. Da Costa was the first among the English authors who again separated them; he assigned to the first the original name of *balanus*, or *acorn shell*, at the same time that he retained the former under the name of *lepas*, or in English *bernaele*, a term preferable, no doubt, to that of *Concha anatifera*, which applied to a single species rather than the whole genus. The observations of Da Costa, as they militate in various respects against the conchological writings of Linnæus, have never perhaps been regarded in this country with sufficient attention, nor with ordinary liberality; he is not, we admit, on every occasion lucid, neither as a systematist does he deserve mention; yet, upon the whole, his remarks are often judicious, and almost constantly correct, and his strictures on the genus *lepas*, as proposed by Linnæus, are in particular satisfactory: he has restored both genera to their proper station. Among the collectors of shells in Britain, from the time of Da Costa to the present, the names of *balanus* and *lepas* have been almost constantly adopted, but the separation of them is ascribed to Dr. Solander, and the discrimination of earlier writers ceases to be remembered. In England, as before observed, the Linnæan term of *lepas* has been retained for one of the two genera; the continental writers, on the contrary, though they adopt this genus in the same form, reject the word *lepas*, and substitute that of *anatifera* in its place; the French call it *anatif*, and under the latter term it is distinguished by their bell writers. Having pointed out the leading character of the two genera into which the *lepas* of Linnæus and Gmelin is divided, it only remains to enumerate the species described by those and succeeding writers to the present time.

#### Species.

**BALANUS.** Shell conic, grooved; operculum, or lid acuminate. Linn. Fn. Succ. O. Fabr. *Balanus majusculus valvæ porcatæ* (*porcatæ*), Da Costa. *Ridged acorn shell*, Donovan. Brit. Shells.

Frequent on the British and other European shores, adhering in vast numbers to rocks, shells and stones; the colour generally whitish or greyish, and the form rather variable.

**BALANOIDES.** Shell conic, truncated, and smooth; operculum obtuse. Linn. *Balanus parvus vulgaris*, Petiv. *Balanus cinereus*, &c List. *Common acorn shell*, Donovan. Brit. Shells.

Found, like the former, in great abundance on the shores of Europe, and also those of the American and Indian seas. When affixed on an uneven surface, the base of this shell sometimes extends down into a pretty long rugged tubular stalk or root. This variety is noted by Pennant, and an extraordinary, but mutilated specimen, is shewn in one of the plates of Brit. Zool. Another occurs in Brit. Shells. Donovan. The colour is commonly greyish; the tips of the valves, as in the last-mentioned variety, greenish.

**INTERTEXTA.** Somewhat depressed; and ribbed obliquely. Donovan. Brit. Shells. *Lepas striata*, Penn.

"This rare species is the *lepas intertexta* of the Portland museum, and was fitted up at Weymouth, adhering to a valve of the *ostrea subrufus*, &c." Brit. Shells.

**COSTATA.** Somewhat conic and fulcated, the ridges equidistant

equidistant and divergent from the aperture; operculum sharp-pointed. *Donov. Brit. Shells.*

A new species found adhering to pieces of broken rocks on the coast of Pembrokehire.

**CONOIDES.** Shell conic, smooth, valves pointed at the tip, aperture very small. *Donov. Brit. Shells.*

A new species described as above, the specimen was found by Mr. Bryer, of Weymouth, affixed to a shell of the *lepas anatifera*.

**TINTINNABULUM.** Shell conic, or bell-shaped, obtuse, rugose, and fixed. *Lepas tintinnabulum*, Linn. *Balanus major*, Lillier. *Balanus major*, the conic centre shell, *Grew. Balanus maximus*, Petiver. *Balanus ore hiantis magnus*, Borlase. *Gland de mer clochette*, Davila. *B. tintinnabulum*, bell acorn shell, *Donov. Brit. Shells.*

Found adhering in large clusters to the bottoms of ships in moist seas. A supposed variety of a dirty whitish colour is mentioned by Chemnitz as a northern kind.

**TULIPA.** Shell subcubic, and smooth; operculum acute and transversely striated. *Müll. Zool. Dan.*

Inhabits the North seas.

**BOREALIS.** Shell erect, subconic, aperture quadrangular, operculum acute and transversely striated. *Donov. Brit. Shells.*

A new species, recorded as above stated. "A few small clusters, with some detached specimens of this curious species of *balanus*, were discovered about the year 1800, attached to the bottom of the Warfight ship of war, when taken into dock to be repaired, after lying in the harbour of Portsmouth for a great length of time. Mr. J. Hay of Portsmouth soon after found two or three shells of the same kind, by dredging in Portsmouth harbour. The species appears to be very rare; we have one specimen attached to the valve of an *ostrea rufus* brought from Newfoundland." *Vide Brit. Shells.*

**DIADEMA.** Shell subrotund, six-lobed and furrowed. *Gmel. Balanus polybalanus*, Walch. *Diadem acorn shell*, *Donov. Brit. Shells.*

A curious and rare species, about the size of a walnut, or sometimes larger; colour whitish. Inhabits the European and Indian seas.

**BALANARIS.** Shell somewhat conic; lobes six elevated wrinkled and four-parted; the operculum membranaceous and bidentated. *Müll. Chemnitz, &c. Whale acorn shell*, *Donov.*

Found adhering to the fins and pectoral wrinkles of the whale (*Balena boops*); its size resembles the last, but its form is very much depressed, colour the same as in *B. diadema*, as are also the furrows of the lobes. This is erroneously described by some authors as the *B. diadema* of Da Costa; we possess the example described by Da Costa under this name, and can in confidence affirm it to be the former species. *See Brit. Shells.*

**PALMIPES.** Shell erect, conic; operculum acute and transversely striated. *Olaf.*

Size of a pea, and smooth. Inhabits the ocean.

**GALEATA.** Shell helmet-form, with a lateral aperture. *Schroet.*

Discovered adhering to the gorgonia verrucosa, and ventrilarium; shell boat-shaped and smooth; aperture rhombic.

**MITELLA.** Shell compressed, erect, and irregularly striated. Linn. *Balanus Rondeletii*, *Gesl. Balanus chinensis striatus*, *Petiv.*

Native of the Indian seas.

**TESTUDINARIA.** Shell plano-convex; rays six excavated and striated. Linn.

Inhabits the depths of the ocean, and is usually found ad-

hering to other shells; the form resembles a globe cut off in the middle.

**SCALPELLUM.** Shell compressed, thirteen-valved, rather smooth, and seated on a scaly peduncle. Linn. *Ellis. Scaly lepas*, *Donov. Brit. Shells.*

A most curious and very elegant species, resembling in some measure the following kind, but rather smaller. *Gmelin* describes it as a native of the Norway seas, on the authority of a specimen met with by Dr. Pontoppidan, the bishop of North Bergen, and which is described by Mr. J. Ellis in the *Philosophical Transactions*, A.D. 1758. He found it sticking on the Norway sea-fan, and, from the peculiarity of its structure, was induced to call it the Norway sea-fan perknife. "This very rare shell is introduced into the British Fauna, on the authority of an example found attached to some sea-weeds, dredged up on the coast of Weymouth, which, after passing through the collections of the late dukes of Portland and Dr. Fordyce, is at present in our possession." *Vide Brit. Shells.*

**ANATIFERA.** Shell compressed, five-valved, smooth, and seated on a pedicle. Linn. *Concha anatifera*, *Merret. Balanus compressus, flat centre shell*, *Grew. Barnacle*, *Gerard. Lepas anatifera, anatiferos acorn shell*, *Donov. Brit. Shells.*

Found in moist seas, and is usually found affixed in clusters to the bottoms of ships, and pieces of decayed timbers floating in the water. The colour whitish, with a fine polish beneath the thin epidermis, and tinged with reddish or bluish-violet; the stems of the finest red.

The tentacula of these animals are long and pectinated like a feather, for which they were in fact mistaken in the sixteenth century; and hence arose the whimsical belief that the barnacle shell was the parent of the barnacle goose! Nor was this the vulgar opinion only; it was sanctioned by the grave details of learned naturalists of that time, and particularly by Gerard, whose observations are generally noticed by authors, in describing this singular marine production. *See BARNACLE Goose.* *See also Gerard's Herbal*, p. 1587.

There are several supposed varieties of *lepas anatifera*, in one of which the peduncle is black.

**ANSERIFERA.** Shell compressed, five-valved, striated, and seated on a peduncle. *Gmel. Donov. Brit. Shells.*

"A native of the American and Atlantic seas, and is chiefly distinguished from *lepas anatifera* by having the valves striated with elevated lines; the valves in the former being perfectly smooth. *Lepas anserifera* has been heretofore considered as a native of the American and Atlantic seas; but that it inhabits likewise the English coast is certain, the shell with the living animal having been dredged up at Weymouth." *Brit. Shells.*

**DILATA.** Shell compressed, five-valved, and thin; dorsal valve dilated at the base with an acute angle, and seated on a peduncle. *Donov. Brit. Shells. Lepas fascicularis*, *Ellis Zoophytes. Lepas sigillatum*, *Muf. Portl.?*

The first and only account we have of this kind of *lepas*, except that inserted in "British Shells," is that given by the late Mr. Ellis, from whom we merely learn that it is from St. George's Channel. The specimen appears to have been sent by Mr. Ellis to the late dukes of Portland, from whence it passed through the hands of the late Dr. Fordyce, and at his death came into our possession, under the title of *lepas sigillatum* of Solander. Unlike *lepas anatifera*, or *anserifera*, (though it is larger than either,) the valves of this shell are uncommonly thin and brittle, in a certain degree corneous, with the largest lateral valve rather crumpled in the usual course of the striae, and marked transversely with

obsolete rays. The shell is likewise covered with a fine pale brown skin, or epidermis. The acute prominent dilation at the base of the valve on the back is very singular. We must be excused for having expatiated with more than usual minuteness on local particulars, in describing the last-mentioned species; as it is principally, and in some instances entirely, on the authority of the individual examples mentioned, that the species are recorded, and their excellence ascertained.

**AURITA.** Shell membranaceous, ventricose, feated on a tube, eared; mouth eight-valved, and dentated. Seba, &c. *Lepas nuda comosa aurita*, Ellis.

Inhabits the North seas. Tube long.

**PETTACUS.** Shell falcated behind, six-valved, and wrinkled. Molina.

Native of Chili. Length an inch; the larger valves resembling the bill of a parrot.

**MINOR.** Shell reddish, six-valved, unequal; operculum pointed. Chemn.

An Indian species. Shell marked with transverse curved lines, dotted with white.

**VERRUCA.** Shell hemispherical, ferrated, six-valved; the four outer valves and the operculum plaited. Spengler.

Native of the North seas.

**ANGUSTATA.** Shell elongated, smooth, six-valved; the aperture narrow; operculum very minute. Chemn.

Country unknown.

**POROSA.** Shell granulated, striated, conic, and tubular; the operculum obtuse. Schroet.

Inhabits India. When living, the shell is green, becoming black after death. A supposed variety of a larger size, and broader in proportion, is described by Klein under the name of *balanus major latus*.

**ELONGATA.** Shell cylindrical, snowy, pellucid, six-valved, and cleft above; lid obtuse, grooved, and transversely striated. Chemn.

A small and very rare species, found in the Iceland seas.

**PATELLARIS.** Shell six-valved; externally violet variegated with white, and marked with fine longitudinal striae; within falcated; valves denticulated at the margin. Spengler.

Native of Coromandel. A rare species; teeth of the valves inserted in each other alternately.

**SPINOSA.** Shell conic, with twelve triangular valves, six of them more depressed, less, and whitish, with transverse striae; six purple, and longitudinally striated, and all armed with tubular recurved spines. Gmel.

Inhabits India.

**VIOLACEA.** Shell thick, glabrous, six-valved, and white, with rays of violet. Chemn.

Native of India. The shell slightly grooved within.

**POLLICIPES.** Shell compressed, erect, many-valved, smooth, and feated on a short, hard, scaly, coriaceous peduncle. Gmel.

Found in the Mediterranean. The four larger valves turned towards each other like the beak of a bird; lesser ones more than twenty.

**CYLINDRICA.** Cylindrical, slightly curved, with a very large oblique orifice; operculum horned. Gmel. *Balanus nasillaris*, Gronov. *Lepas sessilis capensis*, &c., Ellis.

Native of Africa under the torrid zone.

**CRISPATA.** Shell oval-truncated and conic, with six bluish valves shaded with white, and six elevated reddish ones purple and perpendicularly striated. Schroet.

Country unknown.

**CARIOSEA.** Shell solid, white, depressed with carious grooves; within unequally smooth. Pallas.

Native of the seas about the Kurile isles.

**STRÆMIA.** Conic-convex, with four ferrated striated valves; operculum two-valved. Müll.

Inhabits the Danish sea.

**LEPASTRUM**, derived from the Greek *λεπας*, a scale or plate, and *αστρα*, a star, in *Natural History*, the name of a genus of fossils, of the class of the selenites, composed of filaments arranged into broad plates, and those disposed in the form of a radiated star.

Of this genus there are two known species: the one a bright brownish-white kind, with thinner flakes; the other a white dull-looking kind, with thick flakes. They are both found on the shores of Sheppey Island in Kent, and form themselves in the cavities of the septaria, called by authors ludus Helmontii; and the septariae, with these affixed to them, have been accounted a separate species of that body, and called the *starred waxed vein*, or ludus Helmontii stellularis.

**LEPE**, in *Geography*, a town of Spain, in the province of Seville, celebrated for its grapes, figs, and wine; 10 miles E. of Ayamonte.

**LEPECHINIA**, in *Botany*, was named by Professor Willdenow, in his *Lortus Berolinensis*, as a tribute of respect to the labours of John Lepechin, Fellow of the Academy of Sciences at St. Peterburg, who published various tracts upon natural history in the Transactions of that Society. Many of these were botanical monographs; such as, 1. A description of *Iris Gildenstediana*. 2. *Novae species Menthae descripta*. 3. *Quatuor Encorum species descripta*. 4. Reflections on the necessity of studying the virtues of indigenous plants. He appears to have been an able chemist as well as naturalist, and to have travelled through various provinces of the Russian empire in the years 1768 and 1769. We are unable to discover either the time of his birth or of his death, though from the date of his Travels he must have lived about the middle of the last century. Willd. Hort. Berol. 21. Ait. Hort. Kew. ed. 2. v. 3. 390.—Class and order, *Didymia Gymnospermia*. Nat. Ord. *Verticillata*, Linn. *Labiata*, Jusl.

Ess. Ch. Calyx two-lipped. Upper lip of the corolla cleft, lower one deeply divided into three nearly equal segments. Stamens spreading.

1. *L. spicata*. Ait. Hort. Kew. ed. 2. v. 3. 390.—“Spikes of flowers on bracteated footstalks. Leaves ovate, crenate, truncated at the base.”—The native country of this hardy, perennial plant is unknown. The species in question was introduced into the Royal Gardens at Kew in the year 1800, by Mr. John Hunneman, who received it from his friend Willdenow in Germany. By the above specific character we presume there are other species.

**LEPEIGA**, in *Geography*, a town of Hindoostan, in the circle of Gangpou; 30 miles S.S.W. of Gangpou.

**LEPEL**, a town of Russian Lithuania; 55 miles S.E. of Polotk.

**LEPERS.** See ELEPHANTIASIS and LEPROSY.

**LEPERS**, *Isle of*, in *Geography*, one of the New Hebrides, situated between Espirito Santo and Aurora island, eight leagues from the former, and three from the latter, in S. lat. 15° 22', and nearly under the same meridian as the south-east end of Mallicollo. It is of an egg-like figure, very high, and 18 or 20 leagues in circuit. In the north-east part there is anchorage half a mile from the land. It derived its name from Bougainville, who visited it in 1768, and found the inhabitants in general devoured with the leprosy. He describes the inhabitants as being of two colours, black and mulatto. Their lips are thick, their hair frizzled, and that of some is a kind of yellow wool: they are small, ugly, and

ill made. Few women were seen, but they were no less disgusting than the men. They were naked, hardly covering their waists with a mat. They carry their children on their backs in a kind of scarf; they wear ornaments in their nostrils; and have no beads.

**LEPIDIUM**, in *Botany*, is the *Λεπίδιον* of Theophrastus and other ancient writers, and is said by Professor Martyn to be derived from *λεπίς*, a scale, no doubt from the scaly appearance of its pods after their feed is discharged, but that is so usual a circumstance with plants of this tribe, that we are rather inclined with Ambrosius to consider the word *Lepidium* as derived from *λεπίδιον*, to be hot, or pungent, because other plants which have agreed with this genus in its quality of pungency, but in no other way whatever, have been distinguished by the same appellation, and hence its English name, Pepper-wort. Linn. Gen. 333. Schreb. 437. Willd. Sp. Pl. v. 3. 431. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 681. Ait. Hort. Kew. v. 2. 373. Juss. 241. Lamarek. Illust. t. 556. Gærtn. t. 141. Tournef. t. 103. (Nasturtium; Tournef. t. 102.)—Class and order, *Tetradynamia Siliculosa*. Nat. Ord. *Siliquosæ*, Linn. *Crucifera*, Juss.

Gen. Ch. Cal. Perianth of four, ovate, concave, deciduous leaves. Cor. cruciform, of four equal obovate petals, twice as long as the calyx, with narrow claws. Stam. Filaments mostly six, awl-shaped, the length of the calyx, the two shorter ones opposite; anthers simple. Pist. Germen superior, cordate; style simple, as long as the stamens; stigma obtuse. Peric. Pouch heart-shaped, emarginate, compressed, acute at the margin, two-celled; valves boat-shaped, keeled; partition contrary, lanceolate. Seeds few, ovate, pointed, narrower at the base, pendulous.

Eff. Ch. Pouch notched, elliptical, with few seeds; valves keeled, contrary to the partition.

Obs. It is in some cases difficult to draw the line between the pouch of this and *Thlaspi*, even Gærtner considers them as of the same figure. He would retain in *Lepidium*, which he wishes to call *Nasturtium*, those which have solitary seeds, referring the others to *Thlaspi*. The regular corolla distinguishes this genus from *Iberis*, with which it is otherwise most closely allied. The number of stamens is few, in some species is fewer than six.

The species of *Lepidium*, in the fourteenth edition of Linnaeus's *Systema Vegetabilium*, are twenty; Willdenow has twenty-nine. Of these *L. didymum* belongs to the genus *Coronopus*, Fl. Brit. Three of the remainder are natives of England.

*L. petrum*. Mountain Pepper-wort. Linn. Sp. Pl. 899. Engl. Bot. t. 111. Jacq. Austr. t. 131.—Leaves pinnated, entire. Petals not longer than the calyx, slightly notched.—This rare English plant is found on St. Vincent's rocks near Bristol Hot-wells, which has been its habitat ever since the time of Ray. It is occasionally found in other places that are open and exposed, in the south of England, flowering in the early spring. Root biennial, fibrous. Stems two or three inches high, spreading, leafy, somewhat downy. Leaves alternate, unequally pinnatifid, of many pairs of smooth opposite segments, which are elliptical or spatulate, entire. Corymbs of many small, white, hexandrous flowers. Pouch elliptic-oblong, compressed, smooth. Seeds roundish, two in each cell.

*L. latifolium*. Broad-leaved Pepper-wort. Linn. Sp. Pl. 899. Engl. Bot. t. 182.—Leaves ovate-lanceolate, undivided, serrate.—This is also a scarce plant, found in moist saltish marshes, and on maritime cliffs, as at Sheringham, by Cromer, in Norfolk, flowering in July.—Root perennial,

branched, very long. Stems three feet high, erect, leafy, round, smooth, panicled, many-flowered. Leaves alternate, lanceolate or somewhat ovate, attenuated at the base, serrated more particularly in the middle. Flowers hexandrous, small, white. Pouch elliptical, with a sessile stigma. The whole plant is biting and disagreeable. An infusion of it is said by Dr. Withering to be emetic.

*L. ruderals*. Narrow-leaved Pepper-wort. Linn. Sp. Pl. 900. Engl. Bot. t. 1595.—Flowers with two stamens, without petals. Lower leaves pinnatifid, toothed; upper ones linear, entire.—A native of muddy and calcareous soils, which it prefers to find, in the neighbourhood of the sea. It keeps flowering from June to August. Root biennial, branched. Stem a foot high, erect, branched, leafy, wavy, round, hoary. Leaves fleshy, smooth. Flowers small, apetalous, diandrous; the clusters when in fruit becoming very long. Pouch elliptic or roundish, emarginate, smooth. Seeds generally solitary, pendulous, obovate. Dr. Smith mentions in his *Flora* that he never found any petals to this species, nor more than two stamens, though Withering describes the petals as "sometimes wanting," and that the stamens are either two or four.

As to the foreign species, we shall say a few words upon such as are more especially interesting.

*L. persfoliatum*. Various-leaved Pepper-wort. Linn. Sp. Pl. 897. Jacq. Austr. t. 346.—Lower leaves much divided in a pinnate manner; upper ones heart-shaped, embracing the stem, entire.—A native of Austria and the Levant. It flowers in July. Root annual. Stem a foot high, smooth, tinged with purple, dividing into various slender branches, at the end of which are corymbs of small and compressed flowers in long loose spikes. Calyx-leaves yellowish-green. Pouches orbicular, smooth, having a single, bay-coloured seed in each cell.

*L. vespicularium*. Bladdery Pepper-wort. Linn. Sp. Pl. 898. (L. orientale; Tourn. Cor. 15. Buxb. cent. v. 1. 17. t. 26.)—Leaves pinnate; segments linear. Stems inflated at their joints.—A native of Iberia, and the dry plains of Media, where, according to Buxbaum, it flowers in July and August. Dr. Smith has perhaps the only specimen of this species to be seen in this country, which was given him by the celebrated M. Le Monnier from his garden at Versailles in the year 1786. Stem two or three feet high, remarkably inflated at the joints. Leaves pinnate, with long, narrow leaflets. Flowers small, white. Pouch very similar to that of *L. ruderals*.

*L. alpinum*. Alpine Pepper-wort. Linn. Sp. Pl. 898. Jacq. Fl. Austr. t. 137.—Leaves pinnate, entire, smooth. Flower-stalks naked, ascending. Petals larger than the calyx. Pouches lanceolate, pointed.—A native of the German, Swiss, and Italian Alps, where it may be seen in flower from May to August. This pretty little perennial has a slender root. Stems very short, clothed with alternate leaves. Flower-stalks an inch or two in length, bearing a corymbose cluster. Leaves thick, dark green. Flowers milk-white; their petals roundish and entire. Pouch ovate or lanceolate, compressed, with the style at the end. The whole plant is smooth, and has the flavour of Cress.

*L. sativum*. Garden or Common Cress. Linn. Sp. Pl. 899. (Nasturtium hortense; Dod. Pempt. 711.)—Flowers tetradynamous. Leaves oblong, much cut and jagged.—The habitat of this plant so commonly cultivated was unknown, till Dr. Sibthorp discovered it in Greece. Root annual, white, spindle-shaped. Stem upright, smooth, from one to two feet in height, branched at the top. Stems and branches terminated by a spike of flowers. Lower leaves:

*hospites* much resembling those of Parsley; upper ones linear, or lanceolate. *Flowers* small, white. *Calyx* very small, greenish. *Pouch* roundish; valves winged. *Seeds* brown, solitary, tasting like Mustard. This is undoubtedly the *Καρβύσιος* of Dioscorides, and is in universal request for salads in the winter and spring. There are two varieties frequently to be met with, one of them having broad, the other curled leaves. It is said to act as a diuretic and antiscorbutic when taken largely.

*L. oleraceum*. Notch-leaved Pepper-wort. Willd. n. 16. Forst. EfcuL. 69. (*L. bidentatum*; Montin in Nov. Act. Nat. Cur. 6. 324. t. 5. a.)—Leaves elliptic-oblong, acute, serrated. Flowers tetrandrous.—A native of the sandy shores of New Zealand. *Root* perennial. *Stem* herbaceous, from one to three feet in height. *Leaves* scattered, alternate; the upper ones smaller, serrated only at the tip. *Flowers* white. *Pouches* ovate, or heart-shaped, compressed, containing an ovate, acute, reddish-yellow seed in each cell. Forster says that this plant, together with *Apium* or Smallage, and *Tetragonia balsimifolia*, was of considerable service to the ship's crews under Captain Cook, when they lay in Charlotte Sound.

*L. virginicum*, a native of the Caribbee Islands, is eaten by the natives in salads, like our Garden Cress.

*L. piscidium*, found in the South Sea islands, is made use of by the inhabitants for catching fish by incubrating them. It resembles *L. oleraceum*, and is esculent like that species.

LEPIDIUM, in Gardening, comprises a plant of the herbaceous annual kind, of which the species cultivated is the garden or common cress (*L. fativum*). But there are other species which may be cultivated for variety.

It has several varieties, as with broad leaves, with curled leaves, and the common sort with the leaves multifold.

*Method of Culture*.—These herbaceous plants are raised by sowing the seed as wanted for use, at different times of the year, as once a week or fortnight, where a constant succession of small herbs in their young growth is wanted for salads, when only a few days or a week or two old; or, where a constant supply of these small herbs is required in their young seedling growth, some seed, as just noticed, should be sown in succession every week or fortnight at firstest, all spring, summer, and autumn; and once a fortnight in the winter season.

The order of sowing them in the different seasons is, in a warm south border, or other similar situation, or under a frame, &c. in the early spring months; and as the warm season advances, in any open compartment, all in as light earth as the garden affords; but in summer, or hot dry weather, in somewhat shady borders, or in a free situation, shaded with mats from the scorching sun, and daily watered; and in winter, in the warmest situation, or in shallow frames defended with lights, and under hand-glasses; but in frothy or other very cold weather, in that season, on moderate hot-beds; and hot-bed sowings are also requisite during the colder part of the spring, or at any time in cold seasons, where a supply of these and other small salad herbs are required to be raised as quickly as possible. The method of sowing the seed, in all the cases, is very thick, as the plants are mostly used in small young growth, and generally in small, flat, shallow drills, about three inches asunder, so thick as almost to cover the earth, being lightly earthed over a quarter of an inch thick, or less; or on the plain surface, first raking it smooth, then sowing the seed thick as above, smoothing it down with the back of the spade, and either with the spade spreading some fine earth lightly over it as thinly as possible, or covering it by sifting earth over it

evenly a small depth, just to cover all the seed properly. This sort of salad herb should always be cultivated so as to grow as rapidly as possible, being cut while perfectly young, and in a crisp state. See *Small Salad HERBS*.

LEPIDOCARPODENDRON, in Botany, from *λεπις*, *λεπίδος*, a scale, *καρπος*, fruit, and *δένδρον*, a tree; a name given by Boerhaave in his Hort. Lugd. Bat. ed. 2. v. 2. 183, to the *PROTEÆ* with hemispherical heads of flowers, conspicuous for the ample and beautiful scales of their calyx, of which Linnæus composed his genus *Leucadendron*, in Gen. Pl. 46, but which he subsequently united to *Protea*. See LEUCADENDRON.

LEPIDOIDES, *Λεπίδοειδης*, formed of *λεπις*, scale, and *ειδος*, form, figure, or LEPIDOIDES, in Anatomy, a name of the squamous or scaly future of the cranium.

LEPIDOLITE, Wern., Jam. *Lepidolithe*, Häuy. *Lilalite* of some other mineralogists.

The colour of this mineral is generally pale peach-blossom red, or rose red, with an admixture of grey; but it also occurs of a pale violet and light cochineal red; sometimes the greyish-red variety passes into bluish and greenish; and a variety has been observed, in which the green approaches siskin green.

Occurs only massive; but its fragments are said sometimes to shew a tendency to adopting a prismatic form.

Its internal lustre is glistening, passing into shining; it appears sometimes between resinous and vitreous.

Fracture uneven, presenting fine-grained and scaly distinct concretions; fragments generally indeterminately angular, with pretty sharp edges, which are faintly translucent.

It is moderately hard, passing into soft; brittle; though not easily frangible.

Specific gravity, 2,854, Häuy; 2,816, Klaproth; 2,350, Gerhard.

Before the blowpipe the lepidolite, after a slight degree of intumescence, melts into a milk-white semi-transparent pearl. With borax it fuses more readily into a transparent colourless pearl.

Klaproth was the first who analysed this mineral. Among the results of his analysis was a deficiency of  $6\frac{1}{2}$  per cent., which a subsequent chemical examination, (made by the same chemist, with a view to ascertain the presence of potash, which he had a short time before discovered in the leucite) proved to be occasioned by the loss of the same alkali, till then unsuspected to enter the composition of mineral substances. Vauquelin afterwards found the same alkali, but in far greater proportion.

Silica	-	54.50	54.0
Alumine	-	38.25	20.0
Oxyd of iron	-	0.75	1.0
Oxyd of manganese	-		3.0
Potash	-	4.0	18.0
Fluate of lime	-		4.0
Loss, partly water	-	2.50	
		<hr/>	<hr/>
		100	100

Klaproth Beitr. ij. Vauquelin J. d. M. N° 51.

The fluato of lime, in Vauquelin's analysis, is probably owing to particles of fluor spar that were adhering to the specimen examined by that chemist.

Lepidolite is found (exclusively, as it is supposed) on mount Radiceo, near Rozena in Moravia, in a kind of gneiss, which is said to pass into granite on one side, and into mica slate on the other. The accompanying minerals, with

with which it is also mixed, are quartz, feldspar, fluor spar, fluor-beryl, apatite, and common fluor.

Fichtel makes mention of a mass mixed of brownish-violet grains of quartz, whitish shining feldspar, and light and dark coloured lepidolite, which, (if the last-mentioned substance be considered as a substitute for mica, with which it is indeed nearly allied,) constitutes a particular kind of granite hitherto unnoticed.

Beyer has described a variety of lepidolite from Sudermanland, in Sweden; but some writers have doubted this to be real lepidolite.

The lepidolite was, by its discoverers and other mineralogists, referred to zeolite: it had also been mistaken for a variety of foliated gypsum. Klaproth, who determined its real nature, substituted for the nameless name of *lilalite*, that of *lepidolite*, derived from its scaly structure.

What has been described as crystallized lepidolite, is the red variety of fluor-beryl, or pinitic, which is likewise found at Rozena in Moravia, in a quartz matrix.

**LEPIDOPTERA**, from λεπίς, *a scale*, and πτερον, *wing*, in the *Linnean System*, an order of insects, with four wings, imbricated with scales: in the mouth is contained a spiral tongue, and the body is hairy. This order comprehends three genera, viz. the papilio or butterfly, the sphinx, and the phalaena or moth; and each genus includes a number of species.

**LEPIDOSARCOMA**, from λεπίς, *a scale*, and σαρξ, *flesh*. Severinus, a surgical author, implies by this term a sarcomatous and scaly tumour in the mouth.

**LEPIDOSPERMA**, in *Botany*, so called by Labillardiere, from λεπίς, *a scale*, and σπέρμα, *the seed*, because of the six permanent scales which invest the base of that part. Labillard. Nov. Holl. v. 1. 14. t. 11—17. Brown. Prodr. Nov. Holl. v. 1. 233.—Class and order, *Triandria Monogynia*. Nat. Ord. *Calamariæ*, Linn. *Cyperoides*, Juss. *Cyperaceæ*, Brown.

Gen. Ch. *Cal.* Spikelet imbricated every way, of one or two flowers, and one seed; scales several, ovate, concave, acute, for the most part empty. *Cor.* none, except we so call the six flat, membranous, thickish scales, united at their base, which invest the bottom of the germen. *Stam.* Filaments three, capillary, projecting; anthers terminal, oblong, acute, pendulous. *Pistl.* Germen superior, very small; style cylindrical, erect, as long as the stamens, deciduous; stigmas three, equal, recurved, slender, downy, acute. *Peric.* none. *Nut* roundish, obtuse, hard, not burling, accompanied by the above-mentioned six scales, of one cell, with a single roundish kernel.

Ess. Ch. Spikelet of one or two flowers, and one seed. Glumes chafy, imbricated every way, most of them barren. Six flat combined permanent scales at the base of the germen. Style deciduous. Nut solitary, bald, obtuse.

This genus is allied to the *Cladium* of Browne's Jamaica, (confounded with *Schoenus* by Linnæus), but is distinguished by the six scales that accompany the germen. From the *Scleria* of Bergius it differs in the number of its glumes, and in having always androgynous spikelets, of which the upper flower is only male. Labillardiere describes and figures seven species; Mr. Brown defines 19, all from the colder parts of New Holland, or from Van Diemen's land. They are harsh rigid rushy plants, one or two feet high, with strong perennial roots, simple leafless stems, encompassed at the bottom with several long, narrow, mostly equitant, leaves, which are more or less compressed and acute, their edges either smooth or minutely serrated. The panicle or spike is terminal, mostly branched or divided.

Examples of this genus are

*L. gladiata*. Labill. Nov. Holl. v. 1. 15. t. 12.—Panicle dense, repeatedly compound. Stem compressed with an elevated rib at each side; its edges smooth, like those of the leaves. Glumes rather sharp.—Gathered by Mr. Brown at Port Jackson, as well as in Van Diemen's land, and the fourth part of New Holland. The stem is stout and rigid, from eighteen to twenty-four inches high. Leaves half an inch broad, smooth. Panicle upright, large, of numerous acute, oblong, scaly spikelets.

*L. tetragona*. Labill. Nov. Holl. v. 1. 17. t. 17.—Stem dense, somewhat compound. Leaves quadrangular. Stem bluntly angular.—Gathered by the author cited, in Van Diemen's land. The square leaves are very remarkable. It is a much smaller plant than the foregoing. The scales of each spikelet are from four to six only. The nut is elevated on a more conspicuous spongy base than in most of the other species.

Nothing can give a more unfavourable idea of the fertility, comfort, or beauty of a country, than the prevalence of such plants as these; slight examples of which may be seen in our *Schoenus nigricans*, *Nardus stricta*, and a few others, found on the most dreary and barren inland sands. Such of them as inhabit the sea-shore, answer the most valuable purpose possible, in forming a natural barrier against the encroachments of the ocean. See ELYMUS.

**LEPIDOTES**, in *Natural History*, the name of a stone bearing a resemblance to the scales of fishes. The word has been used by some, as the name of those stones which are composed of small flakes, or scales of talc, and by others to express the stones containing fish, or the impressions of fish, found in many parts of Germany.

**LEPIDUS**, M. ÆMILIUS, in *Biography*, a Roman triumvir, was descended from one of the most illustrious families in Rome, and rose to the highest employments of the state. On the death of Cæsar, Lepidus, who was zealously attached to his interests, thought it prudent to conceal himself. He afterwards joined Antony in driving away the conspirators, and obtained the dignity of chief pontiff, through the influence of that leader. Afterwards, when Antony was treated as a public enemy, Lepidus commanded an army of seven legions in Transalpine Gaul. Here Antony arrived in a very distressed situation, and conjured his friend to join his forces to those which he commanded. Lepidus refused, but assured him he would not act with hostility against him. Antony knowing in what estimation he was held by the army, rushed into the camp of Lepidus, where he was saluted with the loudest acclamations. Lepidus was now, in his turn, glad to supplicate the aid of his competitor. Antony treated him with apparent respect, left him the nominal command, while he himself exercised all the real authority. By this conduct, Lepidus lost the confidence of the senate; and in a short time he was declared a public enemy, and Octavianus and Decimus Brutus were sent out against him and Antony. In dividing the Roman world between three masters, Lepidus was allowed a place, principally by way of a connecting medium between the other two. He possessed a considerable family-interest, and was not destitute of military abilities; but he had neither capacity nor temper to take a leading part in political concerns. In the formation of the triumvirate, it was agreed, that while Antony and Octavianus should carry on war against Brutus and Cassius, Lepidus should remain at Rome with four legions, and maintain their authority in the capital. At the bloody proscription, and while the butchery was still raging, Lepidus had the unfeeling vanity to insult the public distress by a triumph, on account of some inconsiderable victories formerly obtained by him over the revolted Spaniards.

Spaniards. He was consul a second time, B. C. 42, with Manlius Plancus. The part of the empire which was allotted to Lepidus, after the TRIUMVIRATE (which see) was fully established, was Africa. In the war with Sextus Pompey, Lepidus brought a large force to Sicily, with which he joined Octavianus; and he shared in the victory obtained against that great general. The confidence he felt at being at the head of a large army, induced him to treat his colleague with haughtiness and neglect; but he had found the mortification to see himself deserted by all his troops, who joined Octavianus. He now supplicated his life of his rival, which being granted him, he retired into a kind of exile at Circeti, a small town in Latium, where he passed the remainder of his days in obscurity. Plutarch. Univer. Hist.

LEPINE, FRANCESCA MARGARITA DI. See MARGARITA.

LEPIOTA, in *Botany*, from *λεπις*, a thin membranous layer, or cuticle, the first section of the great genus *Agaricus* in Perizon's *Synopsis Methodica Fungorum*; the character of which is to have the gills dry and membranous, as the name expresses, not clouded nor footy, and the stalk encompassed with a ring. It includes twenty-nine species, of which *Agaricus procerus* is the first and most remarkable.

LEPISMA, in *Entomology*, a genus of aptera. Gmelin, after the Linnæan manner, defines it as having four feelers, two of which are fetaceous, and two capitated; the lip membranaceous, roundish, and emarginated; antennæ fetaceous; body imbricated with scales; tail ending in fetaceous bristles; legs six, and formed for running. The character of lepisma, as thus expressed, combines the more essential character of Fabricius with that of Linnæus. Lamarck and others propose some further alteration; and, lastly, Latreille, in whose arrangement they form the first family (lepismenæ) of the order thysanoura, divides them into two distinct genera: lepisma and machilis. The true lepisma, according to the new definition, has the antennæ inserted between the eyes, the body flat, and the tail ending in three equal bristles. This genus walks and runs. In the genus machilis, (which moves by skipping,) the antennæ are seated under the eyes, the body convex, and the middle bristle of the tail larger than those at the sides. The three first species are described by Linnæus; the other by Fabricius, and by Müller the author of *Zool. Dan.* All the species, except the first, are natives of Europe. In their various states of growth they prey on decayed wood, and moist or rotten substances; and are most commonly found in damp cellars, neglected water-courses, lead gutters, and similar situations. The larvæ, like the pupa and perfect state, are furnished with six feet, and are remarkable for their activity and swiftness.

#### Species.

SACCARINUM. Scaly, silvery; tail triple. Fabr. *Lepisma vulgare*, Scop. *Forbicina*, Aldrov. *Forbicina plana*, Geoffr. *Lepisma saccharinum*, Donovan. Brit. Inf.

Originally a native of America, from whence it has been introduced and naturalized in Europe. The body is oblong and tapering; antennæ as long as the body; tail terminating in three bristles, and two pair of smaller ones beneath. It secretes itself among old furniture, and runs, when disturbed, with great agility: is often found among fungus.

POLYPODA. Skipping; tail triple; segments of the abdomen villous each side beneath. Fabr. *Lepisma scutata*, *auda triplici*, Linn. Donovan. Brit. Inf.

Inhabits among stones and rubbish on sandy sea-shores, and possesses the faculty of leaping to a prodigious height,

by means of the springs under the tail; antennæ as long as the body.

TERRESTRIS. Naked; tail triple. Linn. Fn. Suec. Gmelin mentions the close affinity this indistinct species bears to the podura tribe, to which it may perhaps belong. It is entirely white and cylindrical, with obtuse antennæ half the length of the antennæ.

LINEATA. Tail triple; body brown, with two white fillets. Fabr.

Inhabits old walls in Helvetia. Antennæ as long as the body, which latter is brown above, with cinereous specks; legs short; thighs compressed.

VILLOSA. Brown, with a triple villous tail. Fabr. Native of China. The head villous-whitish; body beneath whitish; middle spine of the tail longer; legs short and white.

COLLARIS. Black, with a snowy band on the neck and end of the abdomen; tail triple and villous. Fabr.

An inhabitant of the South American islands. Antennæ as long as the body, and brown, with the base pale; head whitish; beneath the tail two short bristles; legs pale.

POLYPUS. Scutate; tail triple. Müll.

Native of Denmark.

MINUTUS. Yellow; tail of three bristles. Müll.

Inhabits same country as the latter. Appendages of the tail sometimes wanting.

LEPITA, in *Hindoo Mythology*, a name of Saraswati, spouse of Brahma, and goddess of literature, harmony, rhetoric, and the fine arts. See SARASWATI.

LEPIUM, one of Hill's names for a variety of gypsum.

LEPOIS, NICHOLAS, in *Biography*, a physician of celebrity in the sixteenth century, was born at Nancy, in 1527. He studied medicine at Paris under Sylvius, together with his elder brother, Anthony Lepois, who was afterwards first physician to Charles III. duke of Lorraine. In this office Nicholas succeeded his brother in 1578. He spent his whole time in sick-chambers, or in his closet, perusing the ancient authors from Hippocrates downwards. He drew up the result of his reading, corrected and corroborated by his personal observation, in an aphoristic form, chiefly with the view of being serviceable to his sons, Christian and Charles, whom he destined for the medical profession; but his friend the celebrated Fœsius, and several other persons, having seen his MS. prevailed upon him to publish it. It was first printed at Franckfort, in 1580, in folio, under the title of "De cognoscendis et curandis pæcipui internis humani corporis morbis, Libri tres, ex clarissimorum medicorum, tum veterum, tum recentiorum, monumentis non ita pridem collecti." Boerhaave had so high an opinion of this author, that he edited this work, adding a preface to it, at Leyden, 1736, in two volumes 4to. Eloy Dict.

LEPOIS, CHARLES, more generally known by his Latin name, *Carolus Pijo*, was son of the preceding, and born at Nancy in 1563. He was sent at the age of thirteen to the college of Navarre, at Paris, where he remained five years, and distinguished himself by his rapid advancement in the knowledge of the languages, belles lettres, and philosophy. He received the degree of Master of Arts in the university of Paris in 1581, and immediately commenced his career in the schools of medicine. After four years, spent in the faculty at Paris, he went to Padua in 1585, and visited the other schools and the learned men of Italy before he quitted that country. He returned to Paris in the beginning of 1588, and took his bachelor's degree in medicine, and two years afterwards became a licentiate; but he left Paris without having taken the degree of doctor, from inability

bility to defray the expences of that ceremony, in consequence of the small income left him by his father. He therefore returned to his native city, where duke Charles III. of Lorraine appointed him his consulting physician, and retained him near his person both at home and in his travels. Duke Henry II. likewise held him in the same estimation; and, among many other marks of his esteem for Lepois, he instituted a faculty of medicine at Pont-à-Mousson, and nominated him dean and first professor. In order to undertake these offices, he repaired to Paris, where he received the degree of M.D., which gave him the power of conferring the same degree upon others, and commenced the duties of his professorship in November 1598. He had now an opportunity of displaying the stores of knowledge, which his acquaintance with the Greek and Latin, Arabic, Hebrew, Italian, and Spanish languages had enabled him to obtain; he was indefatigable in his observation of diseases, and omitted no opportunity of examining by dissection the bodies of those who died; from which he justly anticipated the most important improvements would accrue to medicine. His reputation was elevated to the highest degree, so that he was the physician of all the honourable persons in Lorraine. His zeal in the practice of his profession continued unabated, and ultimately occasioned his death at the age of seventy; for he died of the plague at Nancy, whither he had gone to administer relief to those afflicted by the pestilence, in the year 1633. He left the following works, which have transmitted his reputation to posterity; particularly the first, entitled "Selectiorum Observationum et Consiliorum de præteritis hæcenus morbis, effectibusque præter naturam ab aquâ, seu serosâ colluvie et deluvio ortis, Liber singularis;" Pont-à-Mousson, 1618, in 4to. This work passed through several subsequent editions, one of which, (that of Leyden 1733) was published, with a preface, by the celebrated Boerhaave. A selection from, or an abridgment of it, was also printed in 1630, with the title of "Piso esucleatus," in 12mo. His other works were, "Physicum Cometæ Speculum," Ponte à Moationem, 1619, in 8vo.; and "Discours de la Nature, Causes, et Remèdes, tant curatifs que preservatifs, des Maladies populaires, accompagnées de Dysenterie et autres Flux de Ventre," ibid. 1623, in 12mo. He translated from the Spanish into Latin, "Ludovici Mercati Institutiones ad usum et examen eorum qui artem luxatoriâ exercent," Francofurti, 1625, in folio. He likewise published the following eulogy of his first patron, "Caroli III., Serenissimi, Potentissimique Ducis Lotharingiæ, &c., Mæcenasissimus, seu felicitatis et virtutum egregio Principe dignarum coronæ," 1690. Eloy Dict. Hist. de la Med.

LEPOMERO, in *Geography*, a town of New Mexico, in the province of Hiagui; 130 miles E.N.E. of Riochico.

LEPORARIA AQUILA, a name given by some authors to the *melanotos*, or black eagle, from his destroying great numbers of hares. See *FALCO melanotus*.

LEPORINUM LABIUM, in *Surgery*. See *HARE-LIP*.

LEPORINUM ROSTRUM, a term sometimes applied to the portion of flesh frequently observable between the margins of the fissure in cases of hare-lip. See *HARE-LIP*.

LEPORINUM GENUS, in *Zoology*, the name of a genus of animals, so called from their general resemblance to the hare in shape, and other particulars: the characters by which they are distinguished from other quadrupeds are these; they have feet divided into claws; they feed on vegetables; and they have two very long teeth in the fore-part of their mouths. Ray's Syn. Quad. p. 204.

LEPORINUS OCLUSUS, in *Surgery*. See *LACRIMETHALMIA*.

LEPOTI, in *Geography*, a town of the principality of Georgia, in the province of Kaketi; 22 miles S.E. of Kaketi.

LEPPOWIRTA, a town of Sweden, in the government of Kuopio; 24 miles S. of Kuopio.

LEPRA, λεπρα, quasi λεπρεν, squamula, from λεπτι, a scale; whence our English term *Leprosy*; which see.

LEPRA Lankeng, in *Geography*, a town of Thibet; 68 miles S.E. of Toudlong.

LEPRAS, in *Ichthyology*, the name of a sea-fish of the turdus, or wrasse kind, remarkable for the great variety and beauty of its colouring. It is seldom caught of more than five or six inches in length, and is considerably broad and flat. It sometimes grows to a foot long, but that only in the ocean, never in the Mediterranean sea, where it is usually caught; and even there very rarely. It is spotted all over like the body of a leopard. It is one of the most beautiful fish of the Mediterranean, but is not much esteemed at table, being of an intpid and watery tale.

LEPREUM, LEPREOS, or *Lepræum*, in *Ancient Geography*, a town of Triphlyia, near the confluence of the rivers Jordanus and Alcidon, N.W. of Chaa. It is said to have been founded by a person of the name of Lepros, a famous wrestler, who contended with Hercules, by whom he was vanquished and killed. In the time of Pausanias, the inhabitants of Lepreum assumed the appellation of Arcadians. In this town was a temple of Ceres, constructed of bricks, and near it was the fountain called Arené.

LEPRIA, an island on the coast of Ionia, mentioned by Pliny.

LEPROSO AMOVENDO, in *Law*, an ancient writ that lay to remove a leper, or *lazar*, who thrust himself into the company of his neighbours in any parish, either in the church or at other public meetings, to their annoyance. The writ lies against those lepers that appear outwardly to be such, by sores on their bodies, smell, &c. and not against others: and if a man be a leper, and keep within his house, so as not to converse with his neighbours, he shall not be removed.

LEPROSY, in *Medicine*, a denomination which has been given to a variety of chronic diseases, chiefly affecting the skin; but which has not been exclusively appropriated to those that are characterized by the formation of scales, as the origin of the term imports. Even the Greek writers themselves, and more especially the later ones, have not adhered uniformly to the proper import of the appellation; but the confusion which has prevailed in subsequent periods of medical history, in regard to the application of this term, almost bids defiance to the industry and discrimination of the inquirer. This is partly to be ascribed to the difficulty of conveying accurate notions of cutaneous appearances by verbal descriptions, partly to the extreme variety in which those appearances present themselves, and partly to the neglect of minute observation, where distinctions can only be detected by a careful and practised eye. Thus the latter Greek physicians applied the term *lepra* in a more extended sense than their predecessors, and rendered future discrimination more difficult. But this difficulty was exceedingly multiplied by the translators of the works of the Arabian physicians into Latin, after the revival of learning. The Arabians appear to have distinguished the lepra and elephantiasis of the Greeks, by appropriate terms in their own language: but the translators rendered the word which denoted the latter (*viz. juzam, and baras or albaras*) by the Greek term *lepra*; and the Arabic words (*albohak and alkouba*) which seem to have signified the same with the lepra, a phos, and psona of the Greeks, they translated by the terms *impetigo and morphaea*.

## LEPROSY.

*morphaea* respectively. (See Willan on Cutan. Diseases, 2d edit. p. 112. 117. and 126.) This produced the double confusion of applying the same appellation to a variety of diseases, and of denoting each disease by a variety of names; insofmuch that almost every severe chronic affection of the skin at length acquired the denomination of leprosy, which became rather the name of a class of diseases, than a specific term. This confusion was still farther increased, during the middle ages; when innumerable hospitals and places of resort, together with the means of subsistence, were provided for those who were afflicted by this prevalent malady; and when the epithet of *leprous* was a sufficient claim upon the charity of the Christian world. For every species of disease affecting the skin was represented as *leprosy*; and multitudes of idle and filthy persons obtained a subsistence by themselves in that class.

The same term, *leprosy*, has, moreover, been applied by the translators of the sacred writings, to a variety of cutaneous diseases, respecting the nature of which there has been some difference of opinion; none referring it to the scaly lepra of the Greeks, and others considering it as a variety of the elephantiasis of the same people; we mean the leuce, vitiligo, or albas alba.

In order to arrive at a tolerably clear-notion of the several varieties of signification, which have been given to the term, we must, therefore, consider it under four different heads; namely, the leprosy of the Arabians, of the Greeks, and of the Jews, and the leprosy of the middle ages.

*LEPROSY of the Arabians, or Lepra Arabum*, is the same with the *Elephantiasis* of the Greeks. See ELEPHANTIASIS.

Under that head, we have described at length the symptoms of this formidable disease, as detailed by Aretæus and the other Greek physicians; as well as the appearances, which it has been said to assume in the West Indies, in Arabia, and in other southern climates, in modern times. We must here, however, observe, that the appellation of *Arabian leprosy* has originated in error; and that the imputation of having misapplied the Greek term (*lepra*), which has been generally cast upon the Arabian physicians, appears to be altogether incorrect. This imputation arose from the misinterpretation of their translators, as above stated: and as the works of the Arabians were known only to European physicians, through the medium of these translations, into Latin, it was naturally inferred that the original writers had committed the error. Avicenna describes the elephantiasis under the title of *juzam*, or *aljuzam*, (the appellation which is still given to the disease in Arabia, according to Niebuhr,) and likewise distinctly treats of the *albers* or *albaras*, and the *alcheck* or *albohek* (morphaea of the translators). He carefully distinguishes, however, the albaras from the albohek, the former of which has several symptoms in common with the confirmed elephantiasis (*aljuzam*), and is said often to terminate in it. These symptoms are, a loss of sensibility in the parts affected; a change of colour in the hairs, which become white; and ultimately a loss of the hair; and a change in the colour and texture of the skin, and of the muscular flesh under it, which becomes white and bloodless, like that of oysters, and finally perishes and falls off. These symptoms have, in consequence of the mistakes of the translators of the Arabians, been transferred to the proper scaly lepra, and are conjoined, in the ordinary descriptions of the latter, with the symptoms properly belonging to it alone. But it seems obvious that the Arabian terms albohek and albaras are of nearly the same import as the Greek terms alphas and leuce, which both Hippocrates and Celsus have carefully distinguished; considering the former as a mere blemish of the skin, but the latter as a formidable and almost

incurable disease. See LEUCE. See also Hippoc. lib. *περὶ πιδωδω*. Celsus, lib. v. cap. 28, and Willan on Cutaneous Diseases, ord. ii. genus 1.

*LEPROSY of the Greeks, or Lepra Græcorum*, is principally characterized, as the term imports, by the formation of *scales* on the surface of the skin, which consist of morbid laminae of the cuticle, hard, thickened, opaque, and of a whitish colour, and appear in patches of different sizes, having always nearly a circular figure.

Such is the description of the disease which has been left us by the Greek writers, and which is given as the character of the *lepra* by the best writer on the subject in our own time; we mean Dr. Willan. Hippocrates has not left any circumstantial detail of the symptoms of *lepra*, but speaks of it, together with the *alphos*, *psora*, *hebenes*, &c. as an external blemish, rather than a disease. The later Greek writers, however, although brief in their description of *lepra*, have pointed out the distinctions between it and those similar affections, with which it was conjoined by their predecessors. Aëtius states, that it differs from the *leuce* (vitiligo, or white elephantiasis) in not penetrating deeper than the skin, and leaving the subjacent flesh sound; from the *alphos*, which, though scaly, is more superficial; and from the *psora*, in having large scales, like those of fish; whereas, in the latter, only scurf, or branny exfoliations, appear. (Aët. Tetrabib. iv. fermo i. cap. 134.) It must be here observed that the *psora*, simply, signifies a slight, scaly disease; and not the *scabies*, or itch, which is designated, together with the moist-tetter, by the epithet *ulcerating psora*, *λεπρα δλωδης*. (Aët. loc. cit. cap. 126, 127, and 130. Galen, Introd. Paul. lib. iv. cap. 2.) Paulus Ægineta, in a chapter "On Lepra and Psora," observes, that "both these diseases are characterized by roughness and itching, and a separation of a melancholic humour; but *lepra* affects the skin deeply, in circular patches, at the same time throwing off scales like those of large fishes; whereas *psora* is more superficial, variously figured, and throws off little bran-like substances." (Lib. iii. cap. 2.) Actuarius has given the same account of these diseases. (De Meth. Med. lib. ii. cap. 11.) This scaly *psora* will be afterwards considered, under the appellation of PSORIASIS, which Dr. Willan has appropriated to it, in order to avoid the confusion which would ensue in retaining the term *psora*, which has been applied by many of the moderns exclusively to *scabies*, or itch.

Three varieties of the scaly lepra are observed in this country, according to Dr. Willan, which he has denominated *LEPRA vulgaris*, *L. albidodes*, and *L. nigricans*.

1. The *lepra vulgaris* first shews itself in small, reddish, and shining elevations of the cuticle, on the tops of which thin white scales are seen within twenty-four hours from their appearance. After three or four days, the small elevations are flattened, and at the same time dilated, by an extension of their bases, to the size of a silver penny. These patches continue to enlarge gradually, until they become nearly of the size of a crown piece; they always retain a circular or oval form, are covered with dry scales, and surrounded by a red border. The scales often accumulate on them, so as to form a thick prominent crust, which is quickly reproduced, whether it fall off spontaneously, or have been forcibly detached. On its removal, the surface appears, through a magnifier, to be porous and irregular, or wrinkled; but the furrows do not coincide with the lines of the contiguous found cuticle. The eruption is not attended with any pain or uneasiness, excepting a slight degree of itching, felt when the patient becomes warm in bed, and a sensation of tingling upon

## LEPROSY.

upon any sudden change in the temperature of the atmosphere.

This species of *lepra* often appears first at the elbow, or on the fore-arm, but more generally about the knee; in the latter case, the primary patch forms immediately below the patella. Within a few weeks, several other scaly circles appear along the fore parts of the leg and thigh, increasing by degrees until they come nearly into contact. The disease is then often stationary for a considerable length of time: if it does advance farther, its progress is towards the hips and loins, afterwards to the sides, back, and shoulders, and about the same time to the arms and hands. In a great number of cases, the hairy scalp is the part last affected: although the circles formed on it remain for some time distinct, yet they finally unite, and cover the whole surface on which the hair grows with a scaly incrustation, producing, especially in hot weather, a troublesome itching. In some instances, the nails, both of the fingers and toes, are thickened, and deeply indented longitudinally; either the whole, or some part of each nail is harder, and more prominent than usual.

When the *lepra* extends to all the parts above-mentioned, it becomes highly disgusting in its appearance, and not only inconvenient, from the stiffness and torpor which it occasions in the limbs, but painful where the skin is red and tender, as it sometimes becomes, in the flexures of the joints. The disease, however, is seldom disposed to terminate spontaneously: it continues nearly in the same state for many weeks, or months, sometimes for several years, or even during the remainder of life, yet without being apparently connected with any disorder of the constitution. An appropriate course of medicine, with a regular diet, acts very slowly on the *lepra*, but will at length accomplish its cure; and it then proceeds to a termination in the following manner. First, the incrustation separates from about the centres of the patches, and is no longer reproduced. The scales being farther and farther removed, a circle of red flaking cuticle, deeply indented, appears within the original patch, which still retains a broad hard scaly ring, or border: this border continues till the cuticle within it assumes the usual colour and texture. It then gradually softens, and the cuticular lines being extended over it, every vestige of the disease is erased.

It may be observed, with respect to the scaly *lepra*, that the patches are generally situated where the bone is nearest to the surface, as along the skin, about the elbow, and upon the *ulna* in the fore-arm; along the spine, or *lumbo*, and shoulder-blade; and on the scalp. They rarely appear on the calf of the leg, on the fleshy part of the arm and thigh, or within the flexures of the joints. The disease almost constantly affects both sides, appearing at each elbow, or at each knee about the same time, and extending from thence along the limbs in a similar manner. But although fresh patches arise, from time to time, in different situations, there is no cessation of the complaint in the parts first affected, as happens in some cutaneous diseases; but when it is about to terminate, all the patches assume a favourable appearance at the same time, those nearest the extremities going off somewhat later than the rest. When the extremities, back, loins, and head, are all at the same time covered with dry crusts, it might be expected that the obstruction of the perspiration on so large a surface would produce disagreeable consequences; which, however, is not found to be the case.

The causes of the common *lepra* are not satisfactorily ascertained. Some writers maintain that the disease is both contagious and hereditary; but its contagious nature has probably been assumed from the erroneous notion of the

affinity between the *lepra vulgaris*, and the *elephantiasis*. Dr. Willan (to whose accurate observations we are indebted for the description of *lepra*), asserts, justly, that it is not a contagious disease. He admits, however, that an hereditary predisposition to it is occasionally transmitted from the parent to the offspring. A slow pulse, or a languid circulation of the blood, and, what must generally be connected with it, a harsh, dry, impermeable state of the skin and cuticle, appear to constitute a fundamental part of the pre-disposition. The morbid effects of such a state of the integuments are most likely to be felt in the decline of life: accordingly, the disease is of more frequent occurrence, and proves more inveterate after the age of forty, than at any earlier period; an observation made long ago by Hippocrates and Galen. Willan. loc. cit.

Among the exciting causes of this form of the *lepra*, particular kinds of diet, as dried meats, fish, oatmeal, and some incongruous mixtures of food, are usually mentioned, but not on sufficient authority: at least the disorder is very frequent in this metropolis and its environs, where the articles of diet just mentioned are little used. Nor does it appear that the general opinion, that *lepra* is more prevalent in fishing-towns on the sea-coast, than in other situations, rests upon any better foundation. Exposure to cold and moisture, and the accumulation of scordes on the skin, are the only exciting causes of this variety of *lepra* which Dr. Willan has been able to point out. From the last-mentioned cause, he says, it frequently arises in bakers, bricklayers, labourers, coal-heavers, dust-men, laboratory-men, and others who work among dry powdery substances; for these persons are not able to attend very carefully to personal cleanliness, from the want of public baths, and an imperfect supply of water in their own houses. For our own parts, however, we have seen the disease most frequently in females, where the last-mentioned circumstances had not operated.

2. *Lepra albaeoides*. In this form of *lepra*, the scaly patches are smaller than in the *lepra vulgaris*, and have their central parts a little depressed. The eruption usually begins about the elbow, with distinct, hard, protuberances, not much larger than pimples, and of a dull red colour. These, in a short time, dilate to nearly the size of a silver penny: two or three days afterwards the central part of them suffers a depression, within which minute white scales may be observed. The surrounding border, however, still continues to be raised, but it retains the same size, and the same red colour as at first. All the fore-arm, and in many cases the back of the hand, is spotted with similar patches, which seldom become confluent; but there is sometimes a white incrustation round the point of the elbow. This eruption appears in the same manner upon the joint of the knee, but without spreading far along the thigh or leg. It rarely, if ever, appears on the trunk of the body, or on the face.

This is a disease of long duration, and not less difficult to cure than the foregoing species of *lepra*: even when the scaly patches have been removed by a perseverance in the use of suitable applications, the cuticle remains for a long time red, tender, and brittle; but the small hairs of the skin are not destroyed, nor altered in their colour and texture, as some authors have stated, and as occurs in the *leuce*. This form of the disease seems to have been ranked by the ancients under the head of *rubite albos*, which Galen asserts is a slighter affection, and less rough than the common *lepra*. Celsus, indeed, has classed it (under the generic term *vitiligo*) with the *leuce*; but he points out with care the distinction between the slight *albos* and the incurable *leuce*.

The exciting causes of this form of the disease are probably

bably the same as those of the preceding species. It chiefly affects women and children; and is not infrequently seen, according to Dr. Willan, in those who are employed to dress flax, hair, or feathers.

3. The *lepra nigricans* does not differ much from the *lepra vulgaris*, with respect to its form or distribution; but chiefly in the colour of the patches, which are dark and livid. They appear first on the legs and fore-arms, extending afterwards to the thighs, loins, neck, back, and hands: their central part is not depressed, as in the *alpsides*. They are somewhat smaller than the patches of the *lepra vulgaris*, and have a livid or purplish border. The skin, likewise, appears of a livid colour through the scaly incrustations, which are seldom very thick. It is further to be observed, that the scales are more easily detached than in the other forms of lepra, and that the surface remains longer excoriated, discharging lymph, often with an intermixture of blood, till a new incrustation forms, which is hard, brittle, and irregular. This complaint is particularly troublesome when it covers the face.

The *lepra nigricans* affects soldiers, sailors, sculler-men, stage-coachmen, butchers, brewers'-labourers, and others, whose occupations are attended with much fatigue, and expose them to cold and damp, and to a precarious or improper mode of diet. Women, habituated to poor living, and constant hard labour, are also liable to this disease. It was probably comprised under the denominations of *black alphas* (*Μακρί*), by the Greeks, and of *black aloobak* by the Arabians (or *black morphaea* of their translators.) On comparing their accounts, however, it will be found that some of them represent the black alphas as smooth and shining, like the leuce; while others assert that it is rough and scaly. By this inaccuracy respecting the *black* as well as the *white* alphas, they have led succeeding writers to conjoin the lepra and elephantiasis, diseases generically different.

*Treatment of Lepra Græcorum.*—In the treatment of lepra, the Greek physicians always premised bleeding and strong purgative medicines; but they seem to have depended chiefly on external applications, such as alum, sulphur, nitre, lupines, cabbage-leaves, elm-bark, the dung of goats, mice, and foxes, human urine, and the gall of bears. They likewise used several vegetable and mineral substances, which had a corrosive or vesicating quality; as hellebore, colophonias, the roots of white lily, onion, bryony, asphodel, ranunculus, and anemone, the seeds of mustard, and horse-radish, quicklime, vitriol, &c. Remedies of this kind, or even blisters, are, however, found to have only a temporary effect, their operation being soon succeeded by a re-production of the scaly crusts. Liniments, composed of tar, or of some mercurial preparations, have been much employed, both in ancient and modern practice, with somewhat more beneficial effect.

Of all the *external remedies*, however, which can be employed in the two first species of lepra, frequent *balning* or *washing* is the most advantageous. Dr. Willis was averse to warm-bathing, or the external use of any mineral water, from some theoretical notions, and censures especially the Bath waters, as having converted many cases of slight eruption into a confirmed leprosy. (De Medicam. Operat. sect. iii. c. 7.) It is pretty well ascertained, however, from experience, that not only the waters of Bath, but also the sulphureous waters of Harrogate, Croft, Mofat, &c. used both externally and internally, prove very beneficial in many cases of the lepra. Where the skin is not very irritable, much advantage may be also derived from baths prepared with a solution of alkalinized sulphur, and muriate of soda; and when the surface is very tender,

simple ablution with warm water, or bran and water, has the effect of abating the tingling or itching of the skin, of encouraging the removal of the scales, and of rendering the skin softer and more pliable. Similar effects are produced by the use of the Bath waters, according to Dr. Falconer. (See Memoirs of the Med. Society of London, vol. iv.) "The method in general pursued," this respectable physician states, "is to order the patients to bathe twice or thrice a week, according to their age, strength, and other circumstances. This course is accompanied with a direction to drink the waters, which, at a medium, are taken in the quantity of about a pint daily, and are thought thus to second the good effects of the bath, by promoting an easy and gentle perspiration. If the amendment appears to proceed according to expectation, no other medicines are given, but occasionally such as are opening, if the body be costive." Dr. Falconer also states, that the whole number of persons admitted into the Bath hospital for this disease in the space of four years, from June 12th, 1775, was 83; of whom were discharged 52 "cleansed," and 24 "much better."

*Balning in sea-water.* Dr. Willan observes, is a certain auxiliary in the cure of lepra. "It is usual, and seems proper, first to use a bath of warm sea-water, till the skin be softened, and the scaly incrustations removed; after which a cure is soon obtained, especially in young persons, by bathing in the open sea. As the disease is apt to recur in winter, or in spring, the same plan may be requisite for several successive summers; but I have known it, by perseverance, finally eradicate the complaint. A simple warm-bath," the same physician observes, "with moderate friction, likewise contributes to remove the scales, and to produce a soft red skin, which, in time, regains the usual colour and texture. This plan is sufficient in the slighter cases of lepra, without the use of internal remedies. If the disease affects the extremities only, bathing the whole body is not necessary; it may be enough to apply steam, or warm-water, frequently to the disordered parts." Loc. cit.

Of the mercurial preparations employed externally, we learn from the same author, the muriate, (or sublimate,) and the unguentum hydrargyri nitrat, seem most efficacious in restoring the cuticle, after the leprosy crusts are removed. He does not, however, think the latter preferable to the tar-ointment, which Dr. Willis and others have recommended. This ointment should be well rubbed upon the parts affected every night, and carefully washed off, the following morning, with warm-water, or with a slight alkaline lotion. We may add, that in slight or incipient cases, where there is much dryness and an irritable state of skin, the scales may be often removed by a spirituous lotion; and that the thick crusts which sometimes form upon the patches, may be softened and removed by strong alkaline applications. The use of the decoctions of *solanum dulcamara*, or herb bitter-sweet, or of elm-bark, by way of lotion, has also been found of considerable service in several instances.

Many *internal remedies* have been employed and recommended for the cure of lepra, the efficacy of which has not been strongly established by subsequent experience. Respecting these, Dr. Willan remarks, that antimonials, sulphur, and nitre, have not alone any considerable efficacy; that decoctions of emollient herbs, of guaiacum-wood, sassaaparilla, mezereon, or of elm-bark, which have been recommended as specifics, by no means deserve that character; that calomel, *hydrargyri calcinatus*, *pitule hydrargyri*, or mercurial frictions, applied so as to produce salivation, do not remove the disease; and that the nitrous and muriatic acids, lately recommended in obstinate cutaneous eruptions,

though successful in some cases of lepra, have been given in other cases, for three or four successive months, without any manifest advantage. The tincture of *cantharides* has often been prescribed for the *lepra Græcorum*, as on the authority of Dr. Mead; but that physician recommended it only in cases of elephantiasis, or *lepra Arabum*; and it has been found totally useless in the scaly lepra. See Falconer, loc. cit. Willan, loc. cit.

The following substances may be mentioned, however, as having evinced considerable efficacy, when taken internally, in many cases of lepra. The corrosive *mercurate of mercury*, dissolved in spirit, and taken in small doses for a length of time, has sometimes proved useful; especially when its operation was assisted by some antimonial, given at the same time, with any of the decoctions above-mentioned. The caustic potash in solution, or *aqua kali puri* of the late dispensatories, given in the dose of twenty or thirty drops, thrice a day, in a cupful of any mild fluid, has also manifested some influence over the disease. But the preparations of *arsenic* have been employed with more considerable success, in obdurate cases of lepra, both in form recommended by the late Dr. Fowler, and in that of Dr. De Valangin. The doses of the solution prescribed by Dr. Fowler are larger than are necessary. Five or six drops taken three times a day will be generally sufficient for an adult. We have seen several cases in which the disease yielded readily to this remedy. See Dr. Willan's Treatise, 2d edit. p. 137; where is also an interesting communication on the subject, from Dr. Girdlestone, of Yarmouth.

Among the vegetable remedies, the tincture of *black hellebore* has been occasionally prescribed by Dr. Willan, its dose being regulated so as not to disorder the bowels, and he is of opinion that it has some efficacy; but not more than the mineral remedies already mentioned. The decoction of the twigs and leaves of the *Jolannum dulcamara* (Linn.), has also been found beneficial in the scaly lepra, when taken internally, as well as when applied externally as a wash. Out of twenty-three cases, in which it was employed by Dr. Crichton, two only resisted its action; all the others were cured. The decoction is now ordered in the pharmacopœia of the College, an ounce of the plant to be boiled in a pint and a half of water down to a pint. Of this decoction Dr. Crichton preferred two ounces, at first, to be taken every morning, noon, and evening, but the quantity was afterwards increased, until the pint was consumed every day; at the same time, the patient was ordered to wash the skin with a stronger decoction of the same plant, which considerably accelerated the cure. The remedy seldom begins to exhibit any evident good effects for the first eight days.

The remedies above-mentioned are applicable only to the two first species of lepra; none of them being particularly serviceable in the *lepra nigricans*. This form of the disease requires, in the first place, a regular and nutritive plan of diet, with moderate exercise; it may be afterwards wholly removed by the use of cinchona, and the mineral acids, seathing, &c. Willan, loc. cit.

It must be observed, before we conclude, that, in the venereal disease, circular patches sometimes appear, which resemble those of the *lepra nigricans* in size and colour, but which are not inherited. The dryness and hardness of the skin, so remarkable in the *lepra vulgaris* and *alboides*, do not occur in the venereal lepra; its patches, when somewhat advanced, being as soft and pliable as other parts of the skin. These patches are generally distinct, and at a distance from each other; they seldom exceed the size of a shilling; yet it is probable, Dr. Willan remarks, that they might acquire a greater magnitude, if the progress of the disease

were not early arrested by the use of mercury. As the disease yields to the influence of this remedy, a circular red spot appears for some time in the place of each declining patch, and a minute shallow depression, like a cicatrix, is left at the centre; but no permanent discolouration of the skin remains, as in some other cases. If no medicines were employed, these, like other syphilitic eruptions, would at length terminate in ulcerated blotches.

**LEPROSY of the Jews.** The nature of this disease, which appears from the writings of the Hebrew legislator to have prevailed extensively among that people, after they quitted Egypt under his guidance, has been the subject of much discussion, and of considerable difference of opinion. Some writers have referred it to one of the species of leprosy above-mentioned, and some to the other; and some again have considered it as a disease peculiar to the Hebrew people, differing from every malady with which other nations have been afflicted, and sent by Providence upon them, as a supernatural-punishment. Many of the ancient historians assert, that the Hebrews were expelled the Egyptian territories, in consequence of the general or even universal prevalence of the leprosy among them. Manethon, an Egyptian, who wrote a history of the religion of his ancestors, makes this assertion; and a similar account is given by Lysimachus, Plutarch, Justin, Tacitus, and others. The learned Jewish writer, Josephus, however, treats these accounts as altogether fabulous; and states some substantial arguments in proof of their absurdity and falsehood. (See Joseph. Antiq. Judaic. lib. iii. and contra Apion, lib. i.) The concurrent testimony of the historians, physicians, and poets of antiquity, indeed, goes to prove, that the inhabitants of Egypt, for many ages, were subject to elephantiasis, and that, in fact, the disease originated on the borders of the Nile; and modern observation has ascertained its more recent prevalence in the same countries. This circumstance seems to have led some writers to conclude, that the Hebrew leprosy was the elephantiasis, or *lepra Arabum*, as it has been called. But a consideration of the symptoms, enumerated by the divine lawgiver, sanctions the conclusion, which the majority of writers have drawn upon the subject, that it was neither the elephantiasis, in its ordinary tubercular form, on the one hand, nor the scaly lepra of the Greeks (which, however, it more nearly resembled in its external appearance) on the other; but that it was the *leuce* of the Greek writers, the *vithigo* of Celsus, and the *whitæ albaras* of Avicenna, and the other Arabian physicians. (See LEPRE.) See also Leon. Fuchsii, Paradox. lib. ii. cap. 16. Greg. Horst. Obs. Med. lib. vii. p. 330. Th. Campanella, Ord. Medic. lib. vi. cap. 23. art. 3. Foresti, Obs. Chirurg. lib. iv. Obs. 7. Raymond, Hist. de l'Elephantiasis, p. 64. Herder, vom Abendländischen Anstalt, p. 341.

It will be sufficient to compare the observations of Avicenna, when pointing out the distinction between the *whitæ albaras* and the *alguada* (*morphea* of the translators), with the marks of discrimination detailed in the book of Leviticus, respecting the *unclean* leprosy, and those forms of it which were not deemed unclean, in order to be convinced that the same disease is, in both cases, under the view of the writer. Avicenna states that "both species of *alguada* (*viz. albæ et melas* of the Greeks) are confined to the skin, and merely superficial; but the *albaras* affects both the skin and the flesh, even to the bones." And again; "there is this difference between the white *alguada* and the white *albaras*, that hairs grow upon the skin affected with the former, and they are of a black or brown colour: but those, which grow in the *albaras* are always white; and at the same time the skin is more depressed or sunk, than the rest of the sur-

face of the body. Some depression may, perhaps, occur in the *guada*, but it is very slight. Moreover, a puncture of the skin with a needle draws blood in the *guada*; but no blood follows it in the *baras*, only a watery humidity; and this is incurable." (Avicenna, Canon. Med. lib. iv. Fen. iii. tract. iii. cap. 9.) In the five or six species of leprosy described by Moses, namely, as commencing with a scab or bright spot, a swelling, a rawness of the flesh, a boil or ulcer, and a burning or inflammation, as well as the leprosy in the head, and that connected with baldness, it will be observed, that the two characteristic symptoms are the *whiteness of the hair*, and the *depression of the skin* conjoined, as in the quotation from Avicenna. The whiteness of the surface alone, without change of colour in the hair, or any depression (as it occurs in the *alphas*, *morphea*, or *lepra Græcorum*), is expressly asserted not to constitute an unclean leprosy. "When a man hath have in the skin of his flesh a rising, a scab, or bright spot, and it be in the skin of his flesh like the plague of leprosy, then shall he be brought unto Aaron the priest, or unto one of his sons the priests; and the priest shall look upon the plague in the skin of the flesh. And if the hair of the plague is turned white, and the plague in sight be deeper than the skin of his flesh, it is a plague of leprosy, and the priest shall look upon him and pronounce him unclean." But "if the bright spot be white in the skin of his flesh, and in sight be not deeper than the skin, and the hair thereof be not turned white; then the priest shall shut him up that hath the plague seven days," in order to ascertain the nature of the disease by future inspection. "And the priest shall look on him the seventh day; and behold, if the plague in his sight be at a stay, and the plague spread not in the skin, then the priest shall shut him up seven days more; and the priest shall look on him again on the seventh day: and behold, if the plague be somewhat dark, and the plague spread not in the skin, the priest shall pronounce him clean; if it is but a scab; and he shall wash his clothes, and be clean." Leviticus, chap. xiii.

Nay it appears that the whiteness of the skin, even when extending over the whole body, was not considered as constituting of itself the true leprosy, unless some excoriation, or appearance of "raw flesh," was conjoined with it, or the hair was changed to white, or the depression of surface was observed; and even after excoriation had occurred, if it were sealed over, or became white, nevertheless the person was declared clean. "And if a leprosy break out abroad in the skin, and the leprosy cover all the skin of him that hath the plague from his head even to his foot, where soever the priest looketh; then the priest shall consider; and, behold, if the leprosy have covered all his flesh, he shall pronounce him clean that hath the plague: it is all turned white: he is clean. But when raw flesh appeareth in him, he shall be unclean. And the priest shall see the raw flesh, and pronounce him to be unclean: for the raw flesh is unclean; it is a leprosy. Or, if the raw flesh turn again, and be changed into white, he shall come unto the priest, and the priest shall see him: and, behold, if the plague be turned into white, then the priest shall pronounce him clean that hath the plague; and he is clean." (Loc. cit.) And, in like manner, when the cutaneous disease originates from a "boil," or from a "hot burning," (*ibid.* vers. 18 and 24.) in either case, if, in the place of the boil or burning, there be "a white rising, or a bright spot, white, and somewhat reddish, and it be shewed to the priest; and if, when the priest seeth it, behold, it be in sight lower than the skin, and the hair thereof be turned white, the priest shall pronounce him unclean; it is a plague of leprosy broken out of the boil. But if the priest look on it, and, behold, there be no white

hairs therein, and if it be not lower than the skin, but be somewhat dark; then the priest shall shut him up seven days, &c.;" and if, in the mean time, it remains stationary, "it is a burning boil, and the priest shall pronounce him clean."

And, farther, when the hairy scalp, or the beard, is affected with leprosy, "if it be in sight deeper than the skin, and there be in it a yellow thin hair," the person is pronounced unclean; "it is a dry scall, even a leprosy upon the head or beard." But even if there should be no depression of the surface, yet if there be likewise no black and thick hair, (*i. e.* hair of the natural appearance,) it is still to be considered as "the plague of the scall," and the person is to be shut up for seven days, and to be shaven, for the purpose of more accurate investigation.

Lastly, when after these successive seclusions and examinations, at intervals of seven days, in any of the cases, the unclean leprosy is confirmed; then "the leper in whom the plague is, his clothes shall be rent, and his head bare, and he shall put a covering upon his upper lip, and shall cry 'unclean, unclean.' All the days wherein the plague shall be in him, he shall be defiled; he is unclean: he shall dwell alone; without the camp shall his habitation be."

It is to be inferred, from the preceding quotations, that the Hebrews, during their migration from Egypt to the land of Canaan, were subject to a variety of diseases of the skin and muscular solids, to which the appellation of leprosy was applied, as a general term; but that the most incurable and loathsome species, which was called the *leprosy*, by way of eminence, was that malady, which has been subsequently known in the countries which they traversed and inhabited, and on all the eastern shores of the Mediterranean, under the various denominations above mentioned, of *leuce*, *vittigo*, *albaras alba*, and *elephantia alba* (Plin. Hist. Nat. lib. xxv. cap. 5.) That it was not the elephantiasis of Aretæus, in which the face was deformed with tubercles, the lips thickened, the nose dilated, the ears enlarged and tuberosus, and the countenance distorted, with a reddish brown complexion tending to black; and ultimately with an ulceration of the rugous and tuberculated parts, (see ELEPHANTIASIS,) is obvious from a perusal of the foregoing description. The extreme *whiteness*, indeed, is mentioned in various parts of scripture, as characteristic of the leprosy, and is several times compared to that of snow. This colour is the only circumstance that is stated, in respect to the miraculous leprosy of the hand in Moses himself, as well as in that of Miriam and Gehazi; (see Exodus, chap. iv. ver. 6, also 2 Kings, chap. vi. v. 27. Numbers, chap. xii. v. 10.); and the bright and smooth surface and depression of the spots also afford a contrast to the prominent and rough tubercles of elephantiasis. Nevertheless the leuce has some affinity to the elephantiasis in the loss of sensibility in the integuments and muscles which are affected by it. It would seem, however, to be a legitimate inference from the silence of Moses, that the tubercular elephantiasis was either extremely rare, or not altogether unknown to the Hebrews, or that it was not deemed unclean or contagious.

It is scarcely necessary to remark to the English reader, that the word *plague*, in the preceding passages, of course signifies only the spot or disease; and implies nothing pestilential or infectious. The word, in the Septuagint, is *ἀκαθάρτης*, *plaga*, (a stroke); the latter of which is used in the Vulgate.

It is by no means clear, indeed, that this form of leprosy was actually contagious, or was even deemed contagious; although so much care was enjoined by the law in the examination of the symptoms, and the expulsion of the diseased from the camp was strictly commanded, in case the existence of

of the true leprosy were ascertained. For in the first place, no apprehension of the communication of the disease by infection is any where expressed; the leprosy person is said to be *unclean*. But other circumstances, where no contagion or communication of disease could be suspected, were said, in like manner, to render a person unclean; and the law enjoined, in these cases also, a temporary separation of the person from society, and similar rites, offerings, and ablutions, at the time of being declared clean before the priest. (Levit. chap. xv.) Thus any issue or discharge from the body, the occurrence of the catamenia in women, child-bearing, &c. all rendered a person *unclean*, and equally subject to separation and the subsequent ceremonies. It would seem, therefore, that the loathsome and foul nature of the disease, which inspired this people with a similar horror and disgust to that which is felt towards a corpse ("tanquam nihil à cadavere differentes;" Josephus Antiq. Judaicæ. lib. iii. chap. x. see also Numbers, chap. xii. ver. 12.) was the principal reason for the severity of the law of exclusion, which was ordained against lepers. For we are informed by Josephus himself, that, so far from being supposed to be capable of infecting those about them with their disease, "lepers, in many countries, not only mix in society, but are even held in high estimation; so far from being banished, or looked upon with contempt, they are honoured, in warlike expeditions, with military dignities, and with offices of trust in the administration of public affairs; neither are they excluded from the places of public devotion." (Loc. cit.) The scriptures, indeed, furnish us with an example of the high situation of a leper, in the person of the Syrian general, Naaman, who was in great favour with his king. And even among the Israelites themselves, it would seem that the exclusion of the leprosy was not very rigidly enforced. For we find Gehazi, the servant of Elisha, still in the employment of the prophet, and conversing even with the king, after the leprosy had been inflicted on him "and his seed for ever;" (see 2 Kings, chap. v. and vi. and again chap. viii. v. 4.) to say nothing of the four lepers sitting at the gate of Samaria, who afterwards returned to communicate the news of the desertion of the Syrian camp. (Ibid. chap. vii.) And in after times the leprosy had free access to Christ, and joined in the crowds that followed him. (St. Matthew, chap. viii.) They were also inhabitants of the towns and villages; for Jesus was "in the house of Simon the leper, in Bethany." Ibid. chap. xxvi. v. 6.

These facts, then, afford more than presumptive evidence, that the Hebrew leprosy, the *leuce*, or *vitiligo alba*, was not a contagious disease, any more than the white fealy leprosy, which is common in our own time. And there is much reason for believing, that even the tuberculated leprosy, or elephantiasis, was equally void of contagious qualities, as we shall presently state, notwithstanding the strong assertions to the contrary among the ancients. We have already observed, however, that the latter was considered as a consequence of the white leprosy in many instances, or as the same disease, in a more severe degree; for the lepra was said to change into elephantiasis (Galen. de Tremor. præter Nat. cap. 13.) and this author also mentions two cases, in which, on the contrary, elephantiasis was changed into lepra by a particular mode of treatment. Galen, de Simplic. Med. Fac. lib. xi.

Little can be said, that shall possess any interest, respecting the treatment of the *leuce*, or Jewish leprosy. It was generally deemed an incurable disease in ancient times, and is almost unknown, we believe, at present in Europe. It still, perhaps, appears occasionally in Iceland, and other northern regions, as a precursor, or as a modification of the

elephantiasis, according to the observation of a late intelligent traveller in the island just mentioned. He states, that he saw a woman affected with a horrible disease, which is there called *Lilibræu*, by which her face was so corroded as to present a most disgusting spectacle. "Her legs and hands," he adds, "were swollen to an enormous size; these latter being also covered with a *thick and almost white skin lying in great wrinkles.*" (Hooker's Journal of a Tour in Iceland, p. 186.) The thickened and rugous skin, with the ulcerations of the face, belong to elephantiasis; while the morbid *vitiliginis* is characteristic of leuce. Mr. Hooker also expresses his opinion, that this disease was not contagious. No light has been thrown upon this disease by a still later traveller in the same island, who has recounted the symptoms of elephantiasis, as commonly given in books, and apparently added nothing from personal observation. (See Mr. Holland's Paper on the Diseases of Iceland, in the *fir G. Mackenzie's "Tour"* in that island, just published. Dec. 1810.) Professor Hensler mentions a case, which he once saw for a few minutes, and which appears to have resembled that mentioned by Mr. Hooker. "The whole countenance was puffed up; the cuticle was of a dirty white, or whitish-grey colour, dry and shrivelled; but soft to the touch, as if distended with a watery fluid; with fissures here and there, from which some exudation took place." The cuticle also exhibited some furfuraceous and powdery exfoliations. Hensler remarks, that the comparison (applied by Aaron to his sister Miriam, in Numbers, chap. xii. v. 12.) of such a person to a dead and macerated *fatius*, is a most happy illustration of the appearance. ("Let her not be as one dead, of whom the flesh is half consumed, when he cometh out of his mother's womb.") The physician who attended the patient, seen but once by Hensler, compared the appearance of the skin to that of thick, stiff, dried leather; it was so thick, that an experienced surgeon made several attempts to open a vein, without success, in various parts of the body. There was great swelling, stiffness, and tension of the eyelids, with a frequent ophthalmia, and great sensibility to light. A thick and fetid crust covered the scalp. She was twice so nearly cleared of the leprosy, so as to go out of doors again; the first time by large doses of conium with sublimated mercury; the second, by tincture of cantharides, after antimonials and mercurials had increased the symptoms. A third time she was improving much, under the use of small doses of arsenic, which, however, was necessarily omitted, and she ultimately died. (Hensler vom Abendländischen Aufsatz 3<sup>er</sup> Abchnitt. § 11. p. 351.) It is worthy of remark, that the leprosy, in this case, suspended a pulmonary consumption, the symptoms of which never afterwards returned.

Of the *causes* of this form of leprosy, we shall say nothing, until we come to treat of the leprosy of the middle ages.

With respect to the *leprosy of houses and of clothes*, mentioned in the Mosaic code, it is probable that the expression was merely analogical, the spots and discolourations which appeared upon the walls and articles of apparel being looked upon as resembling the leprosy spots; while, at the same time, as they were most probably the consequence of humidity, the appearance of them might either actually accompany, or precede and prognosticate, diseases in the inhabitants of the houses and wearers of the garments. (Levit. chap. xiii. and xiv.) It is no where said that the disease, called leprosy, is capable of being communicated to the inhabitants or wearers, in these cases; but that it is unclean. The garments were ordered to be burnt, and the stones to be taken away, and replaced by others, or the house ultimately

## LEPROSY.

to be destroyed, when, after certain inspections by the priest, the greenish or reddish spots in them continued.

**Leprosy of the middle ages.** The history of Europe, from the sixth to the fifteenth century, is scarcely less full of the descriptions of the physical distresses of the people, occasioned by famine, pellence, and diseases of the most loathsome and fatal kind, than of the political and moral evils which beset them. Among the maladies of those times, leprosy, under all the forms to which the term has been applied, appears to have existed so generally and unceasingly, as to have claimed a more universal attention than even the plague itself. It was one of the first subjects, on which the active benevolence of the early Christians exerted itself, and ultimately it absorbed a very large proportion of the wealth of Christendom, which was appropriated by the donations of the pious to the maintenance and relief of those who were afflicted with it. These immense charities, however, were at length administered under great abuses, and afford no accurate grounds upon which to calculate the extent of the prevalence of the malady.

In investigating the history of the disease in the middle ages, we shall probably find it sufficiently clear that the elephantiasis, or tubercular disease, (the *Lepros* of the translators of the *Arabians*;) was the principal form against which the precautionary laws were framed; but that almost all cutaneous diseases were popularly considered as of a leprosy nature; that, in fact, many mistakes were committed, and many wilful deceptions practised, by which other diseases were confounded with elephantiasis; and that its disappearance from Europe is probably the result of the amelioration of the moral and physical condition of society, which the progress of civilization and science has brought about.

The general opinion, which was prevalent among the Greeks and Romans, that leprosy diseases originated in Egypt, is in some measure confirmed by the particular consideration given to them in the first history of man; and the more copious and distinct description of these diseases, subsequently given by the Arabian physicians, as well as the accounts published by travellers in more recent times, (see those of Prosper, Alpinus, Tournefort, Niebuhr, Bruce, &c.) who witnessed their frequent occurrence in that and the neighbouring countries, have led to a common belief, that the infection was brought into Europe, in the eleventh century, by the armies that returned from the crusade. But independently of the doubts, which may be entertained, in respect to the contagious nature of *elephantiasis* and *leuc*, there is sufficient evidence recorded, especially among the transactions of the saints, in proof of the prevalence of leprosy in the west, at a much earlier period. Lepers are mentioned in many public acts, according to Muratori (*Antiquit. Ital. Med. Aevi. r. ii. diss. 16.*), in the sixth century; and Gregory of Tours speaks of a place, where these unfortunate persons were accustomed to wash themselves, as well as of a hospital appropriated for them. Gregory the Great, in the same century, likewise alludes to the subject, and particularly mentions one leper, "quem densis vulneribus morbus elephantinus defecerat." In the following century, Rhotaris, king of the Lombards, published an edict against lepers, by which they were considered as dead in the law, and enjoined not to come near to found persons, but to spritz them of their approach, by making a noise with a wooden clapper. There was a river near Atri, in Lombardy, famous in those times for the cure of leprosy; whence, in the eighth century, the Lombards were considered as a filthy leprosy people: and the wise pope Sylvester, upon the plea of leprosy, dissuaded the king of

France from marrying a Lombard princess. So early as the eighth century, St. Othmar, in Germany, and St. Nicholas de Corbie, in France, instituted leprosy houses, which had been already numerous established in Italy. King Pepin, in 757, and Charles the Great, in 789, issued ordinances, by which the marriages of lepers were dissolved, and their association with the healthy prohibited. In the life of St. Athanasius, in the ninth century, lepers are also mentioned; and indeed, in general, the acts of the saints, compiled by the Bollandists, are replete with examples of the malady, throughout Europe, in the middle ages; even in the life of St. Antoninus, so early as the fourth century, a case of leprosy, "horrendissima elephantia lepra," is mentioned. Muratori, *loc. cit.*: also Raymond, *Histoire de l'Elephantiasis*, p. 107; Henfler, *über den Aufsatz*, p. 211.

These facts imply the general prevalence of leprosy in Europe, long antecedent to the Crusades. It is clear, however, that many severe diseases afflicted Europe to a much greater extent, and with augmented virulence, about the period when those fanatical expeditions were executed, or rather from the tenth to the sixteenth centuries, than before; and, among the rest, the leprosy appears to have been everywhere prevalent. Every country abounded with its hospitals, established for the exclusive relief of lepers, although the number of these institutions has been probably exaggerated. Several authors have, by an error in translation, quoted Matthew Paris (*Hist. Angl. ad annum 1244*) for an assertion, that *nineteen thousand* lazarettos existed in Christendom; but that author only states, that the hospitals were, at that period, possessed of 19,000 *manors*. "Habent hospitalarii novem decim millia maneriorum in Christianitate." It is affirmed, however, that Lewis VIII., king of France, made bequests, in the year 1227, to two thousand *leproseries* within his own kingdom. (Raymond, *loc. cit.* 106. *Collect. des Hist. de France*. Du Cange, *Gloss. voc. Lazari*.) In this country, there were a great number of these establishments. It is affirmed, that the city of Norwich alone contained five. (Sprengel, *Geschichte in Theil*, p. 491; who quotes Hutchinson, in the *Polit. Mag.* for Feb. 1789, p. 93.) The most extensive institution of this kind was in Leicester-shire, at a place thence called Burton-Lazars; it was founded in the reign of king Stephen, and dedicated to the Virgin and St. Lazarus, and became possessed of immense riches; so that all the inferior lazaretto-houses in England were in some measure subject to the master of it, as he himself was to the master of the lazars at Jerusalem. (See Nichols's *Hist. of Leicester-shire*.) In London there were six, according to Becket, the largest of which was that of St. Giles, without Temple Bar.

Moreover, the general existence of leprosy diseases is farther evinced by the creation of an order of knighthood, which sprung from the singular combination of military ardour with a zeal for the religion of peace, so prevalent in those times. In the parable of the rich man and the poor man covered with ulcers, recorded in the New Testament, the latter was mentioned by the name of Lazarus; whence the devout disposition of the times invented a St. Lazarus, whose name was given to the order of knighthood, and who was deemed the tutelary saint of the leper-houses, and of each individual leper. So far, indeed, did the mistaken piety of the age extend, that not only was every man, who returned from Palestine affected with foul sores, deemed a saint, *Lazarus*; but was particularly recommended to the devout, as one under the special punishment of God, for the benefit of his soul. Wherefore pious persons of the highest rank believed that they could bring themselves no greater

favour in the eyes of the Deity, than by their attention to these holy sufferers, by washing, killing, and even licking their wounds. Not only priests and archbishops, but even kings are recorded to have performed this nauseous piety at certain seasons. King Robert of France, and Louis IX., have been particularly mentioned as practising these ceremonies. (Du Cange. voc. *Lazarus*. Joinville Hist. de St. Louis. Sprengel, Geschichte, ii. 489, &c.) The knights of St. Lazarus had the double duty assigned them of holy warriors and attendants upon lepers; and the lazarettos were placed generally under their controul. Lepers, indeed, were admitted into the order, and the master of it was also required to be a leprosy knight. (Möchlen de Medicis equalitri dignitate ornatis, p. 56. quoted by Hensler.) The immense wealth, which they accumulated, became at length, however, a temptation to the rapacity of some sovereigns; and Philip V., especially, accused all the hospitaliers in France of high treason, by conspiring with the Turks and Jews, seized their property, and ordered them to be burnt. Sprengel, loc. cit. Mezeray Hist. de France, ii. p. 71.

We may observe, by the way, that the application of the name of Lazarus to every thing relating to leprosy, affords another proof of the very vague manner in which the subject has been generally considered. For not only was the disease of Lazarus not termed leprosy by the divine speaker of the parable; but the statement that his body was "covered with sores," neither represents the picture of the Jewish leprosy, nor of the elephantiasis, nor yet of the lepra of the Greeks. (See a learned diss. by Fred. Hoffman, "De Morbo Lazari," in his works, Supplem. tom. iii. p. 553.)

In all the towns, where lazarettos were established, medical officers were appointed by the police, to examine all persons, who were supposed to be affected with leprosy, previous to their seclusion in those receptacles; indeed, where no such establishments existed, huts were erected a little way out of the towns (where also the hospitals were generally placed) for each individual leper. The rules and edicts, with regard to the conduct of the lepers, were, as far as the circumstances admitted of it, nearly copied from the Mosaic laws. It is obvious, however, from the writings of those physicians, who held the office of examiners after the revival of learning, and indeed it was avowed by them, that the tubercular leprosy, or elephantiasis, was the disease, to the detection of which their inquiries were particularly directed. The earliest writers, who appeared in the dawn of modern learning, (and several of whom added original observation to what they borrowed from Avicenna, and the other Arabians,) described the elephantiasis under the appellation of lepra. (See the works of Guid. de Cauliaco; Gul. de Saliceto, and the Compendium Medicinæ of our learned and able countryman, Gilbertus, who lived about the reign of Edward I., and has left a description of leprosy, so full and minute, as to evince a considerable share of personal observation, notwithstanding the charge of plagiarism from the monk, Theodorick, which Dr. Friend enforces against him.) Greg. Horst, who was one of the appointed examiners at Ulm, in Bavaria, at the end of the sixteenth century, has left us the particulars of the examination, usually practised by himself and his colleagues, when summoned by the magistrates for that purpose. After the preliminary questions relative to the age and family of the person brought before them, they examined him respecting the existence of the disease in his parents and progenitors; his habits of life and his associates, with a view to the probability of contagion; his peculiar temperament, and previous state of health, and particularly as to the sup-

pression of customary evacuations; and then as to the climate, soil, habitation, and diet, to which he had previously been accustomed. They then questioned him, *seriatim*, as to the state of all the functions, mental and corporeal: and lastly, denudatis partibus omnibus, they examined the whole body, with a view to ascertain the presence or absence of the following external symptoms. First they inspected the head, to see whether the hair was beginning to fall off; whether that of the beard was becoming softer and thinner; and that of the eye-brows and eye-lashes was disappearing; and whether, when the hairs were pulled up by the roots, a part of the skin was brought away with them; whether the eyes were round and grim, the ears acuminated, the lips thick, the nose tumefied externally, the nostrils internally stuffed and ulcerated, the face unequally swelled with tubercles, and of a livid red hue? Whether the veins under the tongue were enlarged with tubercles, as if varicose? Whether the skin was unctuous, so that water ran off it, or there were under it tubercles nearly without sensibility, especially behind the ears, and on the extremities? Whether the skin was rough, like that of an unfeathered goose, or affected with horrid fissures, and *rugæ*, resembling the hide of an elephant, or covered with warts, like the *grandines* of swine, or affected with *morphea*, *impetigo*, or a dry and incurable *scabies*? Whether there were any nodes about the joints? Whether the muscles of the extremities, especially about the thumbs, were emaciated? Whether the nails were incurved? Whether the skin was sensible to the puncture of the surgeon's needle? Whether there were offensive ulcers, with a bad habit of body, especially ulcerations and fissures in the fingers and toes? and whether the voice was hoarse and obtuse? They then drew some blood, for the purpose of examining it. "These symptoms being present," says the author, "we deem the disease elephantiasis, and decree that the patient, inasmuch as he is affected with an incurable and contagious lepra, is to be separated from all communion with the healthy." Gregor. Horstii Obs. Med. lib. vii. Obs. xviii. Epit. J. H. Hopfner.

It is obvious, however, from the acknowledgment of Horst himself, as well as from the concurring observations of several physicians before his time, that the elephantiasis was by no means the only disease of the kind admitted into the lazarettos. He goes on to observe, that where the tubercles of the face, the thick lips, acuminated ears, flattened nose, round eyes, (the essential symptoms of elephantiasis) are absent; yet where the patients are affected only with a dry and foul scabies, with pustular eruptions, fissures, and branny exfoliations, which constitute the *psora* of the Greeks; or even with great itching, emaciation, ulceration, and exfoliations of thicker scales, affecting also the head and face, which are the *lepra* of the Greeks; nevertheless they are sent to the lazarettos, if they are poor, for the means of subsistence. "Hence it happens," he adds, "that here, and elsewhere, very few instances of real elephantiasis are found in the lazarettos, whilst many are there, affected only with an obnoxious *psora* or *lepra Græcorum*." We have also the direct testimony of an able observer, Van Foreest, (better known by his Latin appellation, Forestus,) who practised at Alcmæra and Delft, in the middle of the sixteenth century, and who has also left an account of the mode of examination of lepers, adopted by himself, that a very small proportion of the persons, who wandered about the Low Countries, as lepers and beggars, were true lepers; but were merely affected with scabies, or some external derangement of the skin. "Nay," he says, "not one in ten of them is truly a leper, or afflicted with the legitimate elephantiasis." And he adds the authority of a physician at the Hague, who had, with

## LEPROSY.

with him, lamented the carelessness or ignorance of the public examiner at Harlem, by whom a great number, (*quem plurimi*), who were the subjects of some ordinary cutaneous eruption, were declared leprous. (See Forelli, *Observ. Chirurg. lib. iv. Obs. vii. Schol.*) But, above all, Riedlin, who was physician to the leper-house at Augsburg, affirms that, out of *fifty-nine* cases, he saw but one which was elephantiasis, and that in a slight degree; all the rest were instances of the *psora* and *lepra* of the Greeks. (See Shroock, *Misc. Ann. 1669, p. 61*, and Hensler, *loc. cit.*) It is probable, moreover, that in addition to all the ordinary cutaneous diseases, which were thus denominated leprosy, the *scurvey* itself (we mean the true *scorbutus*, which was formerly so well known in our fleets, and which appears to have been not unfrequent in the middle ages, during periods of scarcity and famine) was confounded with the fame disease. This idea was thrown out by Hoffmann. "Quando mecum perpendo hodierni veri scorbuti symptomata, vix mihi temperare possum, quin, iis cum additionibus elephantiacorum collatis, scorbutum leviozem elephantiasos esse speciem asseram; at inde miram morborum pro diversa regionum ac aeris constitutione mutationem considerem. Sed transeat hæc conjectura, digna quæ penitus investigetur." (*De Morbo Lazari, § v.*) Prof. Sprengel also suspects that those forms of leprosy, which have been called *mal de la rosa* in Asturia, and *pellagra* in Lombardy, were scorbutic (*Gesichte der Arzneykund, ii. 486.*); and many analogies between the two diseases are pointed out by Raymond. *Hist. de l'Elephant. p. 118, et seq.*

These leprous complaints began to decline in number and violence, in Italy, about the end of the sixteenth century, and in France and Europe, in general, in the sixteenth. In the middle of the sixteenth century, indeed, the tubercular disease, elephantiasis, was almost unknown in Italy. For Ant. Beniveni, who died very old at the beginning of the sixteenth, observes, that he once saw at Florence a stranger affected with elephantiasis; a disease, he says, almost never seen (in his time) in Italy, and almost unknown to physicians. At the beginning of the sixteenth century, Alex. Benedetti and Joh. de Vego omit the tubercular leprosy from the list of diseases, mentioning it only cursorily, and not from experience; but the latter speaks fully of morphaea, impetigo, baras, alopecia, *mal morto*, and other diseases that have been classed with leprosy. (Hensler, *loc. cit.*) About the middle of the sixteenth century, Francis I. ordered the number of lepers in each lazaretto, or *maladrerie*, to be reported, and after appropriating a sufficient sum for their support, ordered the remainder of their revenues to be given to the grand almoner, for general use. In the seventeenth century, leper-houses were still continued, (though similar measures had been generally adopted since the decline of the disease throughout Europe,) and were greatly abused by the admission of beggars, and idle vagrants of all descriptions, who employed every species of trick to imitate leprosy, or to produce appearances of cutaneous disease. The elephantiasis itself, however, still occasionally appeared, of which several recorded cases are referred to by Hensler. Some writers, indeed, have supposed, that the changes, which took place from the close of the sixteenth century downwards, were rather changes of names than an actual disappearance or diminution of leprosy; and that the *venereal disease*, which was first noticed at that period, was in fact the leprosy with a new appellation. Indeed, some authors actually denominated the *morbus Gallicus*, or syphilis, a leprosy; as Campanella, who treats of it among other leprous diseases, under the title of *lepra Gallica*. (See his *Med. Prædict. lib. vi. cap. 23.*) But although the secondary

symptoms of syphilis might be mistaken for leprosy, or called leprous, in common with other ulcerations and cutaneous affections, in a considerable number of instances, and for some time; yet, as the learned and able Astruc, after Leonicens and others, has shewn, there were so many points of obvious and decided difference, in the symptoms and progress of the two diseases, as rendered such a confusion to any great extent improbable. (See Astruc, *de Morb. Vener. vol. i. lib. i.*) Nevertheless, when we reflect upon the unvarying adherence to ancient authority, which characterized the profession for centuries after the revival of learning; and when we consider, that the measles and small-pox, for instance, were deemed the same disease, including also scarlet fever, so late as the time of Diemerbroeck (see his *Tractat. de Variolis et Morbillis, cap. 13.*); we shall readily conceive, how slow the early physicians would be in acknowledging a new disease, which had not been mentioned by the Arabians, and with what facility they might confound it with the old, under a denomination so vaguely interpreted, as that of leprosy.

At all events, we are entitled to infer, from the preceding view of the subject, that, during the middle ages, most erroneous notions prevailed respecting the leprosy; and that the terrors of the ancients, respecting the contagious and unclean nature of *leuce* and *elephantiasis*, were transferred almost indiscriminately to every chronic cutaneous disease, whether scaly, scabby, pustular, or ulcerous, contagious or non-contagious, which then occurred. And as we are now well acquainted with the latter classes of disease, (although, from causes to be mentioned immediately, they may be much less frequent than formerly), as we know that all the forms of scaly disease, such as the modifications of lepra, psoriasis, ichthyosis, and pityriasis, to use Dr. Willan's nomenclature, as well as the running tetters, or impetigines, the vesicular eruptions, herpes, miliaria, and pompholyx, and the lichens, prurigo, &c. among the papulous affections, are all void of any infectious quality; we must be satisfied, on the one hand, how mistaken was the charity, which erected thousands of hospitals, and appropriated immense treasures, for the maintenance of those who were affected by these disorders, and for the fancied security of the healthy; while, on the other, we see the cruelty and absurdity of the regulations and ceremonies, which were instituted in regard to such patients, somewhat after the manner of those enjoined in the thirteenth chapter of Leviticus, for the Jewish lepers. In fact, a person affected with the real or supposed leprosy, was treated like a dead body: funeral obsequies were performed, and masses said for the benefit of his soul. The whole is thus described by a French writer.

"A priest, clothed in a surplice and stole, repaired with the cross to the leper, who was prepared for the ceremony. The holy minister began by exhorting him to bear patiently, and in a spirit of resignation and penitence, the incurable affliction with which God had stricken him; he then besprinkled the sufferer with holy water, and conducted him to the church. Here the leper put off his ordinary clothes; and, having put on a black habit prepared for the purpose, fell on his knees before the altar, between two trestles, and heard mass; after which he was again sprinkled with holy water. This ceremony, it will be remarked, differed very little from that which is usually performed at funerals. While the leper was conducted to the church, the same verses were sung as at burials, and after the mass, which was also the same as that which was performed for the dead, the *libera* was sung, and the leper was then conducted to the house destined for him. When he had arrived, the priest again exhorted and consoled

consoled him, and threw a shovel-ful of earth on his feet. The hut (where there was no lazaretto) was small, and was furnished with a bed and bedding, a vessel for water, a chest, a table, a chair, a lamp, a towel, and other necessaries. He was presented with a cowl, two shirts, a tunic, and a robe called *houffe*, a little cask, a funnel, a rattle (*des cliquettes*), a knife, a stick, and a girdle of copper.

"Before the priest quitted him, he interdicted him from appearing in public without his leper's habit and naked feet; from going into churches, mills, or where bread was cooking; from washing his hands and clothes, &c. in the wells and brooks; from touching any commodities that he desired to purchase at market, except with a stick, in order to point out the article wanted; and from entering houses, or taverns, for the purpose of purchasing wine, as he had only the privilege of remaining at the door, of asking for what he required, and receiving it in his little cask. He was farther enjoined not to draw water, but with a proper vessel; never to reply to the questions of any one who met him on the road, unless he was to *leeward*, in order that the inquirer might not be infected by his breath, and the contagious odour exhaling from his body; never to place himself in narrow roads; never to touch children, nor to give them any thing which he had touched; never to appear in public meetings; and never to eat or drink with any but lepers. In short, these wretched people were regarded as dead among the living: their children were not baptized at the fountains; and the water employed at their baptism was thrown into lonely places. When a leper was sick, the priest administered the sacrament to him, and extreme unction; and when he died he was buried in his hovel, or in the place of interment appropriated for the leprous." See *Ogé's*, *Abregé de l'Hist. de Bretagne*, prefixed to the *Diction. de Bretagne*.

In most places these miserable outcasts were allowed to enter the towns, near which their hovels or lazarettos stood, at certain times of the year, especially about Easter and Christmas. The following law existed at Marseilles. "Prænti constitutione firmamus deinceps observandum, quod nulli Leprosi seu Mezelli, *divites vel pauperes*, possint vel debeant stare infra Massiliam, nec conversari deinceps, nisi tantum per xv dies ante pascha, et per viii dies ante Natale Domini, &c." (*Stat. Massil. lib. v. cap. 15.*) When they walked, or came into a town, they made a noise with their rattles, to warn passengers of their presence. In short, their situation was truly melancholy. The ties of marriage were dissolved, where one of the parties only was affected; but they were allowed to marry when they could find a leprous companion. They were, indeed, allowed the usufruct of property; but they could neither transfer nor inherit it: they were deemed to have suffered a civil death, and to be "hors de la loi mondaine." See *Hensler*, loc. cit. § 4. *Sprengel*, loc. cit. p. 491-2. *Raymond*, p. 112.

Yet not only were these laws executed against multitudes who were affected with cutaneous diseases, neither properly leprous nor contagious; but it is even very questionable whether the true tubercular elephantiasis itself, any more than the less formidable *baras alba*, or *lucca*, were actually contagious. We have already stated the reasons which tend to disprove the infectious nature of the latter. (See *LEPROSY of the Jews*.) The evidence against the probability of contagion, in the case of elephantiasis, rests partly upon the facts, which are casually mentioned, in more ancient times; and partly upon those which have been more carefully and correctly ascertained nearer to our own. The observations of *Aretæus*, which have been echoed by almost

all succeeding writers, are given with an appearance of terror, excited rather by an acquiescence in the popular belief, than from any actual knowledge of the fact. When we descend to the early ages of Christianity, we find these terrors perpetuated by the laws respecting lepers, which were at once the effect and the cause of a continuation of the popular opinions; but at the same time, we find kings and bishops mixing familiarly and frequently with these very objects of legal proscription, and condescending to offices which require the closest contact with their persons, not only without any expressions of apprehension, but without any one recorded instance of the disease being so communicated: we find, too, that for a term of several days, during certain fairs and festivals, these infected people are actually allowed to mix in the towns; facts which stand in direct contradiction to the traditional prejudices and laws upon the subject.

Defending, still farther, to the period when learning and observation had again enlightened the minds of men, we find these very prejudices and laws extending equally to a numerous tribe of cutaneous disorders which we know are not contagious, as to the elephantiasis; an error which must render the accuracy of the opinion, as to the contagious quality of the latter, exceedingly questionable. At the same time we discover the contention between observation and pre-conceived opinion in the minds of the learned, which almost breaks forth in the admission of the truth. Thus *Fernel*, who adopted the common notion of its contagious quality, admits, nevertheless, that from all the observations he has been able to make, he has never discovered a case which proved its existence (*De Morb. Occult. lib. i. cap. xii.*); and *Forestus*, *Fabricius*, *Plater*, &c. who still held the popular opinion, expressing their astonishment at seeing the daily commerce between the leprous and healthy, even in married persons, without any communication of the disease; so that they are compelled to ascribe its origin to certain qualities of the air and the diet.

When we come to the evidence of our own times, we have still more convincing testimony of the non-contagious nature of the tubercular leprosy. *Dr. Thomas Heberden*, still retaining somewhat of the prejudices of education, when speaking of the cases of the disease which he saw at *Madeira*, says, "Notwithstanding the just abhorrence which every one entertains of this loathsome disease, it certainly is not so contagious as is commonly imagined;" and then he relates his observations, which prove that it is *not* at all contagious. "For I have never heard of any one," he adds, "who has contracted the distemper by contact of a leper; and, on the contrary, I not only am a daily witness of communication between lepers and other people, without the least ill consequences, but know several instances where a leprous husband, married to a sound wife, has cohabited with her for a long series of years, and had several children by her, without her having contracted the least symptom of the disorder, although the children have inherited it; and *vice versa* between a leprous wife and sound husband." (*See Med. Transf. of the Coll. of Phys. vol. i. p. 32.*) Still more recently, *Dr. Adams* has investigated the nature of elephantiasis, in the same island, where there is still a lazaretto, near *Funchal*; and his observations not only confirm those of *Dr. Heberden*, as to the non-contagious nature of the disease; but they also shew that other mistakes, which originated probably in the terrors of the imagination, when the disease had acquired the appellation of *Satyriasis* (from the acuminate ears, flattened nose, and rugous front); namely, that so far from being possessed with a *libido inexpugnabilis*, the pro-creative appetite and power are gradually destroyed, if the disease arise in the age of manhood, and

## LEPROSY.

never developed if it commence before that of puberty. See Adams on Morbid Poisons, 2d edit. chap. 18.

It is true, that about the middle of the 18th century, Dr. Hillary had described the elephantiasis as occurring in the West Indies, with all the characteristics attributed to it by the ancients. But the description of that learned physician is but too obviously a transcript of the account given by Aretæus, uncorrected by his personal observation. (See his Obs. on the Dis. of Barbadoes.) In this the learned writer affords but one example, among a long series of medical scholars, in whom authority but too often dimmed the eye of observation, or distorted its view.

If the leprosy of the middle ages, then, were not contagious, whence did it originate and spread so widely? Probably the hint thrown out by Forelius, Plater, and others, and more fully developed in the excellent treatise of Raymond, already often quoted, may afford an adequate explanation of the fact; to wit, that the uncultivated and marshy condition of the soil; the consequent humid and miasmatic condition of the atmosphere; the salt, putrid, indigestible aliment, and the frequent scarcity even of that which the physical and political disorders of the times produced; the insalubrious condition of the towns and habitations, both in respect to bad situation, want of cleanliness, and other pernicious circumstances; in short, these combined evils, which appear to have existed in those times and countries where the leprosy, among other frequent and distressing maladies, prevailed, were, in all probability, the sources from which these cachectic diseases sprung.

It has been satisfactorily shewn, from a review of the domestic history of the times, in which frequent and fatal epidemics have raged, how much these were connected with the circumstances just enumerated (see EPIDEMIC, and HEALTH); and it is interesting to trace the diminution, and ultimately the total disappearances of these pestilences, in proportion to the amelioration of those physical and moral evils; and to discover, that while the happiness and comforts of man are extended by the advancement of civilization, the worst diseases that harass and shorten life are at the same time nearly extinguished. (See the excellent Obs. on the Increase and Decrease of different Diseases, by Dr. Heberden; also, Ann. Med. Register and Review.) If we turn from the febrile plagues to the more chronic maladies which are the subject of the present article, we find that they have generally gone hand in hand. (See SCURVY, LEONIS SACER, ERGOT, &c.) The history of the *furury*, in particular, affords an analogical illustration of the influence of the circumstances alluded to, in producing many of the loathsome symptoms enumerated among those of leprosy; especially the desquations of the skin, the swellings of the limbs, the ulcerations, fungous excrescences, fetid discharges, gangrenes, and loss of joints and limbs—appearances as hideous as any of those ascribed to leprosy.

Now, this disease has been banished from our fleets within the last half century, solely by the substitution of wholesome and digestible aliment, and by the adoption of ventilation and internal cleanliness; it has, in like manner, been subdued in Germany, and those parts of the north of Europe, where it prevailed fatally in the time of the Romans, in proportion as agriculture and the arts have changed the face of that once marshy and uncultivated region, and obtained a regular supply of nutritious and wholesome food.

If our space would admit of a review of the physical and political circumstances of the times, in which leprosy diseases have been so extensively prevalent, it would be easy to adduce ample proof that, from the beginning of history, these maladies have occurred under such states of society;

and that they have commonly visited, almost exclusively, those classes of society who were most exposed to the influence of those circumstances; namely the poor. Lower Egypt has, from the earliest antiquity, been subject to these diseases, and from the extensive inundations occasioned by the overflowing of the Nile, can never be rendered a dry or salubrious country. The ancient historians concur in their descriptions of its heavy and misty atmosphere, furcharged with vapours. (Strabo, lib. xvii.) The inhabitants ate a glutinous sort of bread made of the roots of the *lotus*, &c.; and used much fish in every fate; and having few trees, they had no wholesome fruits to conjoin with their diet. But how much more imperfectly the Hebrews were nourished in their long march through the wilderness of Arabia is obvious, and indeed recorded; to which all the insalubrious circumstances of a camp were added. Perhaps no combination of circumstances could be conceived more favourable, as well to the production of frequent pestilences, as to the excitement of those cachectic states of the body, in which scorbutic and leprosy affections originate, than the soil and marshes of an uncultivated land, the fordes and miasmata of an immense encampment, frequent scarcity of provisions, fatigue, and universal public anxiety and dissatisfaction, for the quelling of which the great leader had recourse to supernatural means.

It appears from the account of Prosper Alpinus, a professor of Pavia, who visited Egypt late in the sixteenth century, that both the lepra and elephantiasis of the Greeks were common among the poor at that period; and he attributes them to the causes above-mentioned. "They are compelled through poverty," he says, "to drink muddy and semiputrid water; they eat the flesh of camels and beef, and fish salted and half putrid, caught in the marshes and lakes; but they principally live upon a sort of cheese, immoderately salted and semiputrid, which is sold at a very low price." (De Medicina Ægyptiorum, lib. i. cap. xiv.)—a diet very much resembling that formerly used on ship board in long voyages; when, as we have been informed, the salted provision, which had been sometimes two years in casks, emitted an almost intolerable stench during its maceration, before being cooked.

Without attempting to trace the progress of leprosy diseases, in connection with the physical and political derangements in various countries, (a satisfactory sketch of which the reader will find in Raymond's treatise,) we shall merely exemplify this view of the subject by a slight notice of the state of Europe in the middle ages, when leprosy and pestilence of every species prevailed. From the fifth century, when the empire at length fell under the repeated assaults of the northern invaders to the tenth, the finest parts of Europe lay in a state of desolation, little cultivation was practised, all the arts were neglected or lost, and clothing, habitations, and food were alike insufficient and unwholesome; and for three centuries more this desolation was increased, if possible, by the incessant wars that were waged. There were fourteen plagues in the fourteenth century, with intervals of but six years between each; and frequent famines. The food consisted, even in England at a later period, of much salted provision, especially in the winter, and of a hard and black bread, chiefly of rye, to the scarcity of which corn, rather than to its *ergoted* or diseased condition, the *ignis sacer*, *malus ardens*, and other similar maladies, should doubtless be attributed. So little were vegetables cultivated, indeed, or gardening understood, even in the sixteenth century in this country, that, in the year 1509, queen Catharine could not procure a salad, till Henry sent to the Netherlands, and engaged a gardener to come over to raise

raise the proper articles here. (Northouck's *Hist. of Lond* book. i. chap. 7.) How totally delitute of such diet must the people in general have been at a much later period! See *HEALTH of London*.

In short, in whatever country an uncultivated soil, a marshy surface, and a humid atmosphere have been found, together with a diet generally consisting of a staled, semiputrid, insufficient, or indigestible aliment, and composed chiefly of animal flesh or fish, with a small proportion of nutritious vegetable matter; there, from the earliest times, human life has been shortened by the multiplication of pestilential fevers and cachexias of a leprous and scorbutic nature. Therefore, as Raynold observes, even if the ecclesiastical writers of the middle ages had left us no records of the history of such maladies; the history of the soil, of the circumstances of the times, and of the food generally used, would afford an incontestible monument of the existence of leprosy.

Of the *cure*, or of the attempts to remedy a disease which was generally admitted to be incurable, it would be futile to enter into any detail. The treatment of those forms of cutaneous disease, which were classed with the elephantiasis, will of course be described under their respective heads.

LEPSIA, in *Ancient Geography*, an island in the sea of Rhodes, near the coast of Caria. Pliny.

LEPSINA, in *Geography*, a town of European Turkey, in Livadia, anciently called "Eleusis" of which considerable ruins remain; 12 miles N.W. of Athens. See ELEUSINIA.

LEPSIS, in the *Greek Music*, is a name given to one of the rules of the ancient melœpeia, called also sometimes, *cutbia*; by which the composer discerns in which of the three systems of sounds he should place his melody:—in the grave part of the scale, called *hypatoides*; the acute, called *netoides*, or the mean, called *mesoides*. See MELOPEIA and USUS.

LEPSTI, in *Geography*, a town of European Turkey, in the province of Macedonia, in the gulf of Saloniki; 12 miles S. of Jenitza.

LEPTA, in *Botany*, so called from λεπτός, *slender*, or *minute*, from the remarkable diminutiveness of its flowers. Loureir. Cochinch. v. 1. 82.—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Hederaceæ*, Linn. *Vites*, Juss.

Gen. Ch. Cal. Perianth inferior, spreading, small, divided into four ovate segments. *Cor.* Petals four, somewhat triangular, furrowed, inflexed, twice as long as the calyx. *Stam.* Filaments four, awl-shaped, inflexed, inserted into the receptacle at the angle of the base of the petals; anthers ovate, two-celled. *Pist.* Germen superior, roundish, four-furrowed; style scarcely any; stigma obtuse. *Peric.* Berry four-lobed, lobes ovate, slightly confluent towards the centre, single-seeded. *Seeds* roundish.

Ess. Ch. Calyx four-cleft, inferior. Corolla of four triangular petals. Berry four-lobed, four-celled, each cell containing a seed.

1. *L. triphylla*. Loureir. Cochinch. A native of woods in Cochinchina, and called by the natives Cay Mat.—This tree is about ten feet high, and exceedingly branched. *Leaves* ternate, lanceolate, entire, waved, smooth. *Flowers* white, very small, in compound, small, axillary clusters.

We are acquainted with this plant from Loureiro's account only, which approaches so nearly to many different things, that we dare not offer any conjecture respecting it. The habit of this genus very much resembles that of *Cissus*, but the character of its fruit appears to be essentially different.

LEPTADENIA, from λεπτός, *slender* or *sharp*, and ἀδή, *adans*, a gland, expressive of the contracted acute termination of the masses of pollen, which makes a very peculiar

part of the generic character. Brown *Asclep.* 23. Mem. of the Wernerian Soc. v. 1. 34.—Class and order, *Pentandria Digynia*. Nat. Ord. *Convolv.*, Linn. *Apocincæ*, Juss. *Aclepiadæ*, Brown.

Ess. Ch. Corolla somewhat wheel-shaped; tube short; orifice crowned with five scales, standing between the segments; limb bearded. Crown of the filaments wanting. Anthers unconnected, simple at the top. Masses of pollen erect, attached by their base, contracted and pellucid at the summit. Stigma pointless. Follicles . . . . .

Mr. Brown has examined three species, reducible to this genus, in the Banksian herbarium, none of which are yet described, nor has he named or defined them specifically. One was gathered by Forkall. They are all natives either of the East Indies, or of Africa. They appear to be perennial, herbaceous, climbing plants, clothed with a greyish, impalpable, powdery down. *Leaves* flat, opposite. *Umbels* between the footstalks, sometimes cymose. *Stigma* minute.

LEPTANTHUS. See HETERANTHERA.

LEPTASPIS, from λεπτός, *slender*, and ἀσπίς, a shield, a genus of grasses, separated from *Pharus* by Mr. Brown in his *Prodr.* Nov. Holl. v. 1. 211, on account of the peculiar ovate concave outer valve of the corolla; but its habit and inflorescence are so like *Pharus latifolia*, that the author himself candidly expresses his doubts of the propriety of this measure. One species was found by sir Joseph Banks in the tropical part of New Holland; another comes from the Molucca Isles.

LEPTAUREA. See ZOGIA.

LEPTIS MAGNA, in *Ancient Geography*, a town of Africa, on the sea-coast, in the Syrtic region, at the S.E. extremity of that which was particularly denominated Tripolis; not far to the E. of the river Cinyphus. It was also called Neapolis. Leptis was a Roman colony, and in process of time became episcopal. See LEMPTA.

LEPTIS PARVA, *Lempta*, a town of Africa, on the sea-coast, S.E. of Adrymetum, about a mile in compass. Some ruins of the ancient town remain. See LEMPTA.

LEPTOCARPUS, in *Botany*, from λεπτός, *slender* or *sharp*, and καρπός, *fruit*, the minute seed or nut being pointed with the permanent base of the style. Brown. *Prodr.* Nov. Holl. v. 1. 250.—Class and order, *Diocia Triandria*. Nat. Ord. *Tripetaloides*, Linn. *Junci*, Juss. *Raffines*, Brown.

Gen. Ch. Male. *Cal.* of several coriaceous, keeled scales, either fasciculated or imbricated, each one or two-flowered. *Cor.* Petals six, membranous; the three inner ones thinner and narrower. *Stam.* Filaments three, flattish; anthers simple, peltate.

Female, on a separate plant, *Cal.* and *Cor.* as in the male. *Pist.* Germen superior, roundish; style solitary, thread-shaped; stigmas two or three, oblong, downy, acute. *Peric.* Nut small, roundish, not burbling, tipped with the base of the style, with one cell and one kernel.

Ess. Ch. Male. Calyx/scales clustered or imbricated. Petals six. Anthers simple, peltate.

Female, Cal. and Cor. as in the male. Style one. Stigmas two or three. Nut crustaceous, single-seeded, crowned with the base of the style.

A genus of hard rushy plants, of nearly the same description as *Lepidospenna*; see the conclusion of that article; but more akin to the Linnæan *Rellio*, from which it differs in having a simple single-seeded nut, instead of a capsule with two or three cells and as many valves. The stems are generally quite simple, leafless, but clothed with sheaths split at one side. Flowers either in tufts, or in spike-like catkins. Mr. Brown thinks those which come under the

first description may hereafter be separated from the latter. Examples of *Leptocarpus*, are *Reslio distachyos* of Rottboll's Icones 8. t. 3. f. 5, and *Schoenodum tenax* of Labillardiere, Nov. Holl. v. 2. t. 229, the female plant.—Seven species are defined as natives of New Holland, and there are supposed to be several at the Cape of Good Hope, besides the above *Reslio*, and *R. imbricatus* of Thunberg.

LEPTOCEPHALUS, in *Ichthyology*. See MORRIS.

LEPTODECARHOMBIS, a name given by Dr. Hill to some prismatic varieties of selenite. See GYPSUM.

LEPTOMERIA, in *Botany*, named by Mr. R. Brown in allusion to its slender habit; from *λεπτός*, slender, and *μερίς*, a portion or share. Brown Prodr. Nov. Holl. v. 1. 353.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Calycifloræ*, Linn. *Elaeagni*, Juss. *Santalaceæ*, Brown.

Gen. Ch. *Cal.* Perianth superior, of one leaf, in four or five deep, widely spreading, permanent segments, internally coloured. *Cor.* Petals none. Nectary glandular, crowning the germen, in four or five lobes. *Stam.* Filaments four or five, awl-shaped, shorter than the calyx, inserted into the base of each segment; anthers roundish. *Pist.* Germen inferior, ovate; style very short; stigma depressed, of from two to five rays. *Peric.* Drupa ovate, more or less juicy, crowned with the calyx. *Seed* solitary.

Ess. Ch. Calyx of one leaf, wheel-shaped, superior, bearing the stamens. Nectary glandular, crowning the germen, four or five-lobed. Stigma divided. Drupa of one seed.

Eight species are defined by Mr. Brown, as natives of New Holland. They are slender branched shrubs, with scattered minute leaves, or none at all. Flowers minute, white, reddish or green; generally spiked, with a small deciduous bractea to each; sometimes axillary, without bracteas. The genus is akin to those species of *Thegium* which grow at the Cape of Good Hope, but differs in its glandular nectary, which is either of one piece, lobed, crowning the germen, or composed of glands, each of which stands at the base of one of the segments of the calyx. Three of the species have a starry five-rayed acute stigma, and five-cleft, spiked, bracteated flowers; among which is *L. Billaudieri*, (*Thegium drupaceum*; Labill. Nov. Holl. v. 1. 68. t. 93.) from Van Diemen's land, a slender much-branched shrub, six feet high. One, *L. acerba*, found at Port Jackson, has a two-lobed obtuse stigma, four-cleft flowers, and no leaves. The remaining four have a drier drupa, a notched blunt stigma, and five-cleft flowers, and all grow on the south coast of New Holland.

LEPTOS LIBANOTIS, in the *Materia Medica of the Ancients*, a name given by some of the Greek writers to the small frankincense, that is, such as came to their hands in small flakes, broken from the larger masses in the gathering or packing up. This was also called *manna thuris*, the manna of frankincense, the word *manna* being of old used to express any thing formed of granules, or small pieces. The ancients esteemed this *leptos libanotis*, or *manna thuris*, when pure, beyond any other kind, for they always valued that frankincense most, which was driest and most brittle; and such only as was so, could break off in these small flakes. The medicine, however, soon became subject to adulteration, and lost its credit; for the dust of the frankincense being allowed to be put up among this *manna thuris*, Dioscorides tells us, that in his time people, greedy of gain, had found the way to adulterate it, by adding, instead of this genuine dust, the sifted powder of the resin of the pine-tree. See FRANKINCENSE.

LEPTOSPERMUM, in *Botany*, so named by Forster, from *λεπτός*, slender, and *σπέρμα*, seed, because the numerous

seeds are remarkably small and slender. Forst. Gen. 36. t. 36. f. f—l. Smith Tr. of Linn. Soc. v. 3. 260. Willd. Sp. Pl. v. 2. 948. Ait. Hort. Kew. ed. 2. v. 3. 181. Juss. 323. Lamarck. Dict. v. 3. 405. Illustr. t. 423. Gærtn. t. 35.—Class and order, *Scandria Monogynia*. Nat. Ord. *Heperidea*, Linn. *Myrti*, Juss.

Gen. Ch. *Cal.* Perianth half-superior, in five deep, ovate-oblong, or roundish, often coloured segments. *Cor.* Petals five, with claws, roundish, equal, twice the size of the calyx, and much longer than the filaments. *Stam.* Filaments numerous, inserted into the calyx, awl-shaped, incurved, shorter than the corolla; anthers small, roundish, two-lobed. *Pist.* Germen half-inferior, turbinate; style simple, columnar, erect, about the length of the filaments; stigma capitate, umbilicated, undivided. *Peric.* Capsule roundish, coated in the lower part, of three, four, or five cells, and as many valves, bursting at the upper part, the partitions from the middle of each valve, opposite to each calyx-tooth. *Seeds* numerous, linear, somewhat angular, tapering at each end, very small, inserted into the central column.

Ess. Ch. Calyx five-cleft, half-superior. Petals five, longer than the filaments, furnished with claws. Stigma capitate. Capsule of three to five cells. Seeds angular.

Obs. *L. ambiguum* only has the filaments longer than the corolla.

This genus of New Holland shrubs was confounded by Dr. Solander with *Philadelphus*, and by Gærtner, Forster, and others with *Metrofideros* and *Melaleuca*. The former is distinguished from it by having the style deeply four-cleft, with simple stigmas, the petals broad at the base and sessile, leaves opposite and deciduous, and the habit indeed altogether unlike; *Metrofideros* differs in its simple stigma, extremely long thread-shaped filaments, and more dilated habit, in which characters *Melaleuca* accords with the latter, with a few exceptions as to habit in the foliage of some species, but differs from it and from *Leptospermum* in the polyadelphous stamens.—The species of the genus before us are rigid, branched shrubs, of rather humble, sometimes prostrate, growth, aromatic when bruised; their leaves alternate, small, entire, evergreen; flowers numerous, usually solitary, white, often with a purple tinge about their organs of impregnation. The following are all at present known to us.

1. *L. scoparium*. New Zealand Tea, or common South-sea Myrtle. Andr. Repof. t. 622. (*L. squarofum*; Gærtner. v. 1. 174. t. 35. *Melaleuca scoparia*; Linn. Suppl. 343. Forst. Prodr. 37. Pl. Efc. 78. Schrad. Sert. Hannov. 25. t. 15. *Philadelphus scoparius*; Soland. in Ait. Hort. Kew. ed. 1. v. 2. 156. Tea plant; Cook's Second Voyage, v. 1. 100. t. 22.)—Leaves ovate, sharp-pointed, obscurely three-ribbed. Calyx smooth; its teeth membranous and coloured.—Native of the coast of New Zealand, where it was discovered by sir Joseph Banks and Dr. Solander, and was thought by captain Cook to have been very serviceable to the health of his crew. Its infusion or tea is pleasantly aromatic and fragrant; if not suffered to stand too long, in which case it becomes bitter. Mixed with an equal quantity of the New Zealand Spruce, (see DACRYDIUM,) it was found to make excellent and highly palatable beer, of the most salutary qualities, the *Dacrydium* being too astringent alone. This plant, raised at Kew from seed in 1772, is easily kept in our green-houses, and is covered in summer with elegant white blossoms, whose calyx-teeth, filaments and style are purplish. In New Zealand it becomes a small tree. The leaves are numerous, scattered, ever-green, small, nearly sessile, entire, sharp-pointed, rigid, smooth,

## LEPTOSPERMUM.

smooth, dotted, paler beneath, more or less ovate, but varying extremely in length and breadth, so that the two varieties indicated by authors are by no means distinctly marked, and the gardeners make many more, which are equally evanescent. The *capsule* is hard and woody, permanent on the old branches long after the seeds are dispersed, as in most New Holland plants of this family.

2. *L. stovefcens*. Yellowish South-sea Myrtle. Sm. Tr. of Linn. Soc. v. 3. 262. Willd. n. 3. Brown in Ait. Hort. Kew. ed. 2. n. 2. (*L. Thea*; Willd. n. 2. *Melaleuca Thea*; Schrad. Sert. Hannover. 24. t. 14.)—Leaves linear-lanceolate, obtuse, without lateral ribs. Calyx smooth; its teeth membranous, coloured, naked. Native of New South Wales. It was procured from thence for Kew garden, by sir Jos. Banks, about 1787. The *branches* are longer, and more flexible, than in the former; *leaves* narrower, longer, almost linear, inclining to elliptic, and pointless. *Petals* white, often with a purple tinge, turning yellowish in drying. The *calyx-teeth* are coloured, that is, whitish, not green; which Willdenow, in copying the character, has omitted, and this caused the same omission in Hort. Kew.

3. *L. attenuatum*. Fine-branched South-sea Myrtle. Sm. n. 3. Willd. n. 4.—Leaves linear, slightly lanceolate, acute, three-ribbed. Calyx clothed with silky hairs; its teeth membranous, coloured, nearly naked.—Native of New South Wales, sent to Kew by sir Jos. Banks in 1795. Its slender habit, and narrow acute *leaves* distinguish this from both the former. The *flowers* moreover are smaller, often two together, their stalks, *germen*, and base of the calyx clothed with silvery, silky, rather spreading hairs. *Petals* and *calyx-teeth* white. It blossoms from May to July.

4. *L. grandifolium*. Large-leaved South-sea Myrtle. Sm. Tr. of Linn. Soc. v. 6. 299.—Leaves lanceolate, sharp-pointed, obscurely five-ribbed, downy beneath. Calyx hairy; its teeth membranous and coloured.—Sent from Port Jackson, New South Wales, in 1795, by Dr. White to Mr. Lambert. It is larger than any of the foregoing in all its parts; the *leaves* above an inch long, and near a quarter of an inch broad, lanceolate inclining to obovate, with a small prominent sharp point; shining and smooth above, except when young; paler, opaque, dotted, downy, and marked with two slight lateral ribs, on each side the principal one, beneath. *Flowers* large, white and handsome, sessile and solitary at the ends of the short lateral leafy branches. The back of their *calyx-teeth*, as well as the *germen*, is covered with long, white, shaggy hairs.

5. *L. trinerve*. Silky South-sea Myrtle. (*L. lanigerum*; Willd. Sp. Pl. n. 5. *Melaleuca? trinervia*; White's Voyage, 229. t. 24.)—Leaves lanceolate inclining to obovate, three-ribbed. Calyx silky; its teeth leafy, permanent.—Native of New South Wales; *Dr. White*. This has much the habit of the last, but is in all its parts only about half the size. The *leaves* vary in breadth, and are more or less obovate. The *germen*, with the *calyx* and its teeth, are entirely clothed externally with beautiful, close-pressed, silky or filvery hairs. *Petals* white.

6. *L. lanigerum*. Hoary South-sea Myrtle. Brown in Ait. Hort. Kew. ed. 2. n. 4. Sm. Tr. of Linn. Soc. v. 3. 263. (Philadelphus laniger; Ait. Hort. Kew. ed. 1. v. 2. 156.)—Leaves oblong or obovate, obscurely three-ribbed, somewhat hairy. Calyx clothed with long shaggy hairs.—Native of Van Diemen's land, and of New South Wales. In the Transf. of the Linn. Soc. this was confounded with the last, but Mr. Brown has corrected that mistake. The present species has the *germen* and whole *calyx* remarkably hoary with long spreading hairs, not silky with close or erect

ones. The *leaves* when young are more or less hairy, and the young *branches* downy. The scales of the flowering *buds* appear also to be larger and more permanent, imbricated, elliptical, and externally hairy.

7. *L. parvifolium*. Small-leaved South-sea Myrtle. Sm. Tr. of Linn. Soc. v. 3. 263. Ait. Hort. Kew. ed. 2. n. 5.—Leaves obovate, imbricated, ribless. Young branches and calyx clothed with spreading hairs; teeth membranous, coloured, naked.—Sent to us from New South Wales by Dr. White in 1795. It is said to have been communicated to Kew garden by sir Jos. Banks in 1789. The *leaves* are not a quarter of an inch long, numerous, imbricated, either obovate or exactly elliptical, blunt, flat, thickish, without any rib, dotted, smooth, on short pale smooth stalks. *Flowers* terminal, solitary, small, white. *Germen* and base of the *calyx* clothed with spreading hairs, but the teeth are naked, roundish and coloured. The younger branches are rough with coarse, long, spreading hairs.

8. *L. imbricatum*. Imbricated South-sea Myrtle. Sm. Tr. of Linn. Soc. v. 6. 30.—Leaves obovate, imbricated, ribless. Branches and calyx smooth; teeth membranous, coloured, naked, keeled.—Gathered at Port Jackson, New South Wales, by Mr. David Burton, and communicated to us by sir Jos. Banks in 1797. It greatly resembles the last, but the copious little *leaves* are still more strikingly imbricated, especially on the long lateral *branches*, which moreover are smooth, as well as every other part. The *flowers* are extremely small, standing two or three together about the end of each branch; their *germen* and *calyx* perfectly naked; the teeth of the latter sharply keeled, which in *L. parvifolium* are only a little convex.

9. *L. arachnoideum*. Cobweb-flowered South-sea Myrtle. Sm. Tr. of Linn. Soc. v. 3. 263. Gærtn. v. 1. 174. t. 35. f. 3.—Leaves awl-shaped, sharp pointed. *Branches* hairy. *Germen* and calyx entirely clothed with long spreading hairs.—Native of New South Wales. The *stem* is stout, apparently of humble growth, with numerous, short, zigzag, leafy, hairy, lateral, compound branches. *Leaves* crowded, awl-shaped, sharp-pointed, smooth, dark-green, about half an inch long, channelled above, convex beneath, resembling some slender kind of juniper. *Flowers* small, solitary, terminating the short subdivisions of the branches, and remarkable for the very long and fine white spreading hairs, like a spider's web, which clothe the *germen* and whole calyx. It is a stranger to our gardens.

10. *L. juniperinum*. Juniper-leaved South-sea Myrtle. Sm. Tr. of Linn. Soc. v. 3. 263. Venten. Malmalf. t. 89.—Leaves linear-lanceolate, sharp-pointed. Young branches silky. Calyx smooth; its teeth membranous, coloured, naked.—Native of New South Wales. Mr. Fairbairn raised it in Chelsea garden about the year 1790. This is an upright bushy *shrub*, whose young branches are clothed with silky hairs. The *leaves* are larger, and still more like juniper, than those of the preceding; silky when young. *Flowers* numerous, white, solitary at the ends of the very short, lateral, axillary, leafy shoots. *Germen* depressed, smooth as well as the *calyx* and its teeth, which are broad and coloured.

11. *L. trilobulare*. Three-celled South-sea Myrtle. Venten. Malmalf. t. 88.—Leaves linear-lanceolate, sharp-pointed. Calyx silky; its teeth coloured, minutely fringed. Stamens fifteen. Capsule of three cells.—Native of New Holland. We know it only by the plate and description in M. Ventenat's superb Jardin de la Malmaison. The habit and foliage are much like the last. *Branches* downy and reddish. *Germen* rather more elongated, clothed with short silky down, as are also the *calyx-teeth*, which are fringed, and

coloured of a purplish red. *Petals* white. *Stamens* but fifteen, and cells of the fruit only three.

12. *L. baccatum*. Pulpy-fruited South-sea Myrtle. Sm. Tr. of Linn. Soc. v. 3. 264. (*L. juniperifolium*; Cavan. Ic. v. 4. 18. t. 331. f. 2.)—Leaves linear-lanceolate, sharp-pointed. Bractæas smooth. *Germen* and calyx-teeth downy. Capsule with a pulpy coat.—Native of New South Wales, sent to Kew garden by sir Jos. Banks in 1790. A low depressed rigid shrub, with the habit and foliage of our English dwarf variety of the juniper. *Flowers* much like some of those last described, but their *germen* and whole *calyx* with its teeth are clothed with white cottony, rather than silky, hairs. The *germen* is closely enveloped in smooth, somewhat fringed, concave bractæas, which, being taken for the *germen* itself, caused an error in the original description of this species; but indeed that part becomes smooth as it ripens into fruit, as well as very thick and pulpy. The *petals* are yellowish in the dried plant, but probably white when recent, like *L. flavescens*. Cavanilles's synonymy seems rightly applied in Hort. Kew. though he describes the *calyx* as smooth. The *fruit* in our plant, as well as his, has five cells.

13. *L. ambiguum*. Hook-leaved South-sea Myrtle. Sm. Tr. of Linn. Soc. v. 3. 264. Exot. Bot. v. 1. 115. t. 59. (*Metrofideros corifolia*; Venten. Malmaif. t. 46.)—Leaves linear-lanceolate, recurved at the point. Calyx nearly smooth; its teeth leafy, lanceolate, naked. *Stamens* longer than the corolla.—Native of New South Wales, sent to Kew garden by sir Jos. Banks in 1791. It forms a handsome bushy evergreen shrub, blossoming plentifully in the green-house in summer. The *branches* are downy. *Leaves* numerous, crowded, dark-green, channelled, dotted, bluntish, recurved at the tip, often roughish. *Flowers* white, with very numerous spreading *stamens*, that are peculiar in this genus as being longer than the *corolla*, yet not near so long as in *Metrofideros*, and the capitate *stigma* stamps our plant a *Leptospermum*, which the habit altogether confirms. Ventenat describes the *germen* as of three cells only; we find four or five, so that this character appears variable.

14. *L. virgatum*. Wand-like South-sea Myrtle. Forst. Gen. 36. Willd. n. 12. (*Melaleuca virgata*; Linn. Suppl. 343. Forst. Prodr. 37.)—Leaves opposite, linear-oblong, bluntish. Stalks axillary, three-flowered.—Gathered by Forster in New Caledonia. As Willdenow has admitted this into *Leptospermum*, we would not leave it out, notwithstanding the reasons given in Tr. of Linn. Soc. v. 3. 265; which strongly induce us to think it a decadrous *Bacca*. The *stamens* are ten. *Leaves* opposite, whereas in every certain *Leptospermum* they are alternate. The umbellate *flower-stalks* too are not natural in this genus.

15. *L. pubescens*. Downy Twisted South-sea Myrtle. Willd. n. 6. See Tr. of Linn. Soc. v. 3. 263.—Leaves elliptic-obovate, downy, twisted, with a small recurved point. *Germen* and calyx-teeth downy.—Native of New Holland, common in gardens. We subjoin this as a species taken up by Willdenow from the Linn. Transf. but whose limits we have not yet fully determined. It does however seem distinct enough from *laniger* and *trinerose*, as well as from all the rest. Much more light is to be expected relative to all the species of this genus from the sequel of Mr. Brown's Prodrömus, and we therefore leave these two last species for future determination, especially as the *pubescens* is not received into the second edition of Hort. Kew.—For similar reasons we leave unnoticed the three species figured in Cavanilles, t. 330 and 331, which most probably are referable to some of the above; but his plates and descriptions are insufficient to de-

termine which, and would therefore still be useless, if by any means determined.

LEPTOSTACIYA, from λεπτός, slender, and σταχυς, a spike of flowers, elegantly applied by Mitchell to the *Phryma* of Linnæus, and retained by the latter as the specific name. See PHRYMA.

LEPTOSTACIYA, from λεπτός, slender or narrow, and σταχυς, the mouth, expressive of the narrow orifice of the capsule. Brown. Tr. of Linn. Soc. v. 10. 320.—Class and order, *Cryptogamia Musci*. Nat. Ord. *Musci*.

Ess. Ch. Capsule oblong, without furrows, terminal. Lid hemispherical, without a beak. Fringe a simple, flat, annular, undivided membrane, from the inner coat.

All the four known species of this genus are natives of the southern hemisphere. They are mosses of a densely tufted mode of growth, with upright, branched, perennial stems. Leaves moderately spreading in every direction, broadish, entire, revolute, with a strong midrib, and a terminal hair, which is suspected by Mr. Brown to be sometimes branched. Fruit-stalk terminal. Capsule either erect or drooping; tapering at the base into an inversely conical apophysis; much contracted at the mouth. Veil smooth and naked, deciduous.

1. *L. inehuanus*. Tr. of Linn. Soc. v. 10. 320. t. 23. f. 2.—Leaves obovate, obtuse. Capsule drooping, obovate-oblong.—Found by Mr. Brown in Van Diemen's land, upon rocks and stones at the east side of Table Mountain, near the summit, in 43 south latitude, and from 3000 to 3500 feet perpendicular above the sea. This moss is two or three inches high. *Stems* but little branched, leafy in the upper part, densely clothed with rusty down below. *Leaves* rather concave, very minutely dotted or reticulated, tipped with a twisted hair  $\frac{1}{4}$ th the length of each leaf. *Fruit-stalk* brown, smooth. *Sheath* at the base accompanied below by numerous abortive pistils and capillary, jointed, succulent threads.

2. *L. erectum*. Leaves oblong-parabolic, obtuse. Capsules oblong, erect. Found by Mr. Brown on the east coast of New Holland, in a mountainous part of the country, growing on rocks near the banks of the rivers Hawkebury and Grose. *Stems* about as tall as the former, simple or branched, clothed with rusty down in their lower part, leafy above. *Leaves* crowded, a little incurved and close-pressed by drying, each tipped with a purple hair. *Fruit-stalk* elongated, brown, smooth. *Capsule* straight. The lid had fallen off.

3. *L. gracile*. Leaves ovate-oblong, rather pointed; terminal hair half their length. Capsule oblong, straight, drooping.—Gathered by Mr. Archibald Menzies, at Dusky bay in New Zealand. The *stems* are densely tufted, somewhat branched, about an inch high, thickly clothed with rusty down in their lower part. *Leaves* yellowish-green, dotted, close-pressed when dry, pellucid, strongly revolute, with a very thick rib, and a smooth terminal hair. *Fruit-stalk* near two inches high, slender, tawny, with a sheath at the bottom, the summit very slender and drooping. *Capsule* nearly pendulous, a quarter of an inch long, slender, straight, slightly swelling in the middle, of a dark opaque brown. Lid very small, obtuse, of a still deeper brown.

4. *L. Menziesii*. Leaves oblong-lanceolate, acute; terminal hair a quarter their length. Capsule cylindrical, drooping, recurved.—Discovered by Mr. Menzies at Statenland in 1787. We, as well as Mr. Brown, are indebted to him for fine specimens of this and the last. The *stems* of *L. Menziesii* are half an inch or more in height, mostly simple, with dense rusty fibres and roots. *Leaves* bright yellowish-green, crowded, finely dotted, wavy and close-

pressed when dry, with a shortish terminal hair. *Fruit-stalk* about an inch high, solitary, erect. *Capfulæ* light brown, smooth, one-third of an inch long, drooping, cylindrical, singularly recurved, with somewhat of a turgid appearance. *Lid* very small; after it is fallen the white, membranous, very delicate fringe becomes distinctly visible.

Mr. Brown with good reason suspects *Bryum macrocarpum* of Hedwig, Crypt. v. 3, t. 10, may belong to this genus. If so, there is an error in the delineation of its fringe; and it will prove the only known species whose leaves are tipped with a branched hair.

LEPTUM, in *Antiquity*, a small piece of money, which, according to some, was only the eighth part of an obolus; but others will have it to be a silver or brass drachm.

LEPTURA, in *Entomology*, a genus of Coleoptera: the antennæ are setaceous; palpi four, and filiform; wing-cafes tapering towards the tip; thorax slender and rounded. Those of the Linnæan lepturæ which have the lip entire, constitute the genus *Donacia* of Fabricius; and such as have the lip bifid form a part of the lepturæ of that author; for the latter do not exclusively consist of those insects which, according to the Linnæan character, belong to leptura; leptura abbreviata of Fabricius, for example, is *neocydalis* major of Linnæus, and leptura variegata, the Gmelinian *neocydalis* variegata. Most of the Linnæan tribe are furnished with legs of pretty considerable length; run with much speed and activity; and are found on flowers.

## Species.

AQUATICA. Golden; posterior thighs clavated and dentated. Fabr. *Leptura aquatica*, Linn. *Leptura aquatica spinosa*, Degeer. Donov. Brit. Inf. *Donacia dentata*, Hoppe.

The colour of this species varies from reddish, or brassy, to green; the antennæ blackish, with pale testaceous at the joints; head with a line down the middle; thorax grooved; body beneath downy; legs obscure, testaceous. Common in Britain, and other parts of Europe, on aquatic plants, particularly the nymphæa.

SIMPLEX. Golden; thighs simple. Fabr.

A European species, perhaps *leptura aquatica mutica* of Degeer.

FASCIATA. Golden; wing-cafes with a purple longitudinal band. Herbt. *Leptura aquatica fasciata*. Degeer.

Inhabits watery places in Europe. The thighs sometimes armed with teeth.

MICANS. Posterior legs bidentated; flanks simple; wing-cafes glossy-violet. Hoppe.

Allied to *L. aquatica*, and inhabits the same places.

HOLOSERICÆ. Shining-green; antennæ and legs fulvous, black; posterior thighs dentated. Herbt.

An European species, found in damp fields, &c.

PALUSTRIS. Blackish-violet; antennæ and legs chestnut; posterior thighs dentated. Herbt.

A native of Pomerania; found in marshes.

CINEREA. Cinereous, speckled with coppery. Herbt. Inhabits with the former.

MARGINATUS. Posterior thighs one-toothed; wing-cafes golden; margin and spot at the base rufous; abdomen and legs silvery. Hoppe.

On aquatic plants in Germany.

NYMPLÆÆ. Posterior thighs dentated; thorax and wing-cafes coppery; body cinereous, downy. Fabr.

A native of Europe, on the leaves of the nymphæa alba. The head is coppery; antennæ and mouth black; body beneath silvery-brown.

SAGITTARIÆ. Posterior thighs one-toothed; wing-cafes

green-golden, minutely punctured and truncated; abdomen and legs golden. Hoppe.

Antennæ blackish; thorax wrinkled and furrowed.

VIOLACEÆ. Deep black, and somewhat brassy; wing-cafes obscure, violet; abdomen sanguineous. Pallas.

Size of leptura aquatica, and inhabits Siberia.

ÆNEÆ. Posterior thigh armed with one tooth; wing-cafes brassy, equal, rounded; abdomen and legs brassy. Hoppe. *Leptura ænea*, Linn.

Native of Europe.

BICOLOR. Golden; thorax above, with the wing-cafes, green, the latter with stripe of impressed dots; posterior thighs dentated. Linn. Mus. Lest.

An European species.

FUSCÆ. Posterior thighs with a single tooth; body brown; wing-cafes striated and punctured; mouth, antennæ, and legs rufous. Linn.

Inhabits with the former.

CRASSIDÆ. Posterior thighs unarmed; body green-bronzed, beneath cinereous, brassy; wing-cafes striated with punctures, and marked with transverse small lines; mouth, antennæ, and legs rufous. Linn.

Native of Europe.

RUFESCENS. Posterior thighs dentated; body reddish-bronze; beneath cinereous-bronze; wing-cafes striated, punctured with crenated wrinkles. Linn.

Inhabits Germany and Sweden.

NITIDA. Posterior thighs toothed; body shining-green gold; wing-cafes striated and punctured, with crenated wrinkles, and a broad, common, purple-green fillet; abdomen, antennæ, and legs gold. Linn.

Native of Europe.

CÆRULÆ. Posterior thighs dentated; body blue; wing-cafes striated, punctured with crenated wrinkles; antennæ brassy. Linn.

Inhabits Europe.

CLAVIFÆ. Posterior thighs unarmed; body brassy; abdomen covered with silvery down. Fabr.

Native of Germany, on aquatic plants.

FASCICULATA. Body black; posterior legs long; thighs unarmed; the flanks with a tuft of long feathers. Fabr.

Inhabits Cayenne; the body very slender, with a silvery gloss beneath.

LINEARIS. Posterior thighs unarmed; wing-cafes linear, truncated, shining-brassy; legs somewhat testaceous. Hoppe.

A species found in Europe; antennæ blackish; abdomen cinereous.

HYDROCHARIS. Posterior thighs unarmed; wing-cafes cinereous, glossy, rounded at the end; body and legs cinereous. Hoppe.

Native of Germany; the antennæ cinereous.

MICRONATA. Posterior thighs unarmed; body above livid; beneath, head, and antennæ black; thorax with two divergent lines; wing-cafes spinous at the end. Hoppe.

VULGARIS. Posterior thighs unarmed; body silvery-green; wing-cafes striated and punctured, with crenate wrinkles, and a broad, common, purple-green fillet; head, abdomen, and legs silvery-ash.

## \*\* Lip bifid.

UNIPUNCTATA. Black; wing-cafes rufous, with a black dot in the middle. Fabr.

Inhabits about Dresden.

HASTATA. Deep black; wing-cafes red; tip and future in the middle black. Fabr. *Stenocorus niger*, &c. Geoffr.

Native of the southern parts of Europe. Segments of the abdomen with silvery down at the edge.

## LEPTURA.

- BIPUNCTATA.** Black, villous; wing-cafes livid, with a black dot in the middle. Fabr.  
 Inhabits Siberia.
- TOMENTOSA.** Thorax villous and golden; wing testaceous, with the tip black. Geoff.  
 Head and antennæ black; wing-cafes smooth, slightly notched at the tip; abdomen covered with silvery down; tail emarginate; legs black.  
 Native of France.
- MELANURA.** Black, wing-cafes reddish or livid, the future and tip black. Schæff.  
 Inhabits Europe on flowers.
- LÆVIS.** Black; wing-cafes and legs livid, future, and tip of the wing-cafes black. Fabr. *Leptura futuralis*.  
 Antennæ black; body clothed with silvery down. Native of Europe.
- LIVIDA.** Black; wing-cafes testaceous and without spots; legs black. Herbit.  
 Wing-cafes rounded at the tip, and scarcely emarginate. Native of Germany.
- VILLICA.** Ferruginous; antennæ, wing-cafes, and breast brown. Schæff., &c. Fabr.  
 Inhabits Europe; first joint of the antennæ rufous.
- MERIDIANA.** Thorax somewhat spinous; wing-cafes fastigate; breast shining. Schæff.  
 Male blackish, female testaceous; legs of the larva long. A native of Europe.
- STRIGILATA.** Black; wing-cafes testaceous, with a blackish fillet. Fabr.  
 Native of Sweden.
- EMARGINATA.** Black; wing-cafes purple, tip black, and emarginate. Fabr.  
 Inhabits Cayenne, the abdomen bidentated at the end; segments shining silvery at the base.
- SANGUIOLENTA.** Black; wing-cafes sanguineous. Linn. Fn. Su. *Leptura dubia*, Scop.  
 Native of Northern Europe.
- RUBRA.** Black; thorax, wing-cafes, and shanks purple-red. Linn.  
 Inhabits Sweden.
- TESTACEA.** Black; wing-cafes testaceous; shanks rufous; thorax rounded behind. Fabr.  
 Found in the north of Europe, and is supposed to be the male of the former.
- REVESTITA.** Testaceous; wing-cafes, breast, and antennæ deep black. Schreber.  
 Native of Germany.
- PUBESCENS.** Black, with cinereous down, rib of the wing testaceous at the base. Fabr.  
 Inhabits Sweden.
- VIRENS.** Silky greenish; antennæ varied with brown and green. Oliv.
- SMARAGDULA.** Silky greenish; antennæ and legs black. Fabr.  
 Inhabits Sweden.
- ATRA.** Body entirely deep black. Oliv. Fabr. *Leptura ethiops*, Poda.  
 Legs sometimes testaceous; abdomen with white silky down.
- HUMERALIS.** Black; shoulders and abdomen ferruginous. Fabr.  
 Native of Germany.
- SCUTELLATA.** Black; scutel white. Fabr.  
 Inhabits Italy.
- SUTURATA.** Cinereous; wing-cafes testaceous, with a black future. Fabr.
- Found in Germany; the antennæ testaceous, with black tip; legs rufous, the joints black.
- EXCLAMATIONIS.** Black; wing-cafes with a yellow line down the middle, and a dot at the base. Fabr., &c.  
 A small species found in Sweden.
- LURIDA.** Ferruginous; wing-cafes testaceous. Fabr., &c.  
 Inhabits deserts of Hircania.
- FEMORATA.** Black; thighs rufous at the base. Fabr.  
 Found in Saxony.
- RUFICORNIS.** Black; antennæ and legs rufous. Fabr.  
 Native of Italy. Body covered with yellowish down.
- MARGINATA.** Black; margin of the wing-cafes and hind shanks rufous. Fabr.  
 Inhabits Norway.
- NIGRA.** Wing-cafes tapering; body black, polished; abdomen red. Schæff.  
 An European species.
- PRAEUSTA.** Body covered with golden down; head and tip of the wing-cafes black. Fabr.  
 First joint of the antennæ ferruginous; legs red. Native of Europe.
- QUADRIMACULATA.** Black; wing-cafes testaceous, with a black ring. Oliv.  
 Native of Germany.
- 4-GUTTATA.** Brown; wing-cafes black, with two ferruginous dots at the base. Fabr.  
 Inhabits Saxony.
- ROSTRATA.** Dull brassy; legs yellow. Fabr.
- SUBSPINOSA.** Black; wing-cafes testaceous, with four black bands, the first punctured; antennæ and legs yellow. Fabr. &c.  
 Perhaps the female of the last. Head black, with a fulvous frontal band; wing-cafes emarginate; three segments of the abdomen yellow. Native of Germany.
- AURULENTA.** Black; fore and hind margin of the thorax golden; wing-cafes testaceous, with four simple black bands. Fabr.  
 Inhabits Germany; segments of the abdomen edged with white.
- DUBIA.** Black and somewhat villous; wing-cafes testaceous, dotted with black; legs black. Fabr.  
 Native of Siberia. Allied to *Leptura attenuata*.
- SEXGUTTATA.** Black; wing-cafes with three yellow spots. Fabr.  
 Inhabits Germany. Herbit.
- QUADRIFASCIATA.** Black; wing-cafes testaceous, with four indented black bands. Linn. *Leptura octomaculata*, Degeer. *Cerambyx fasciatus*, Scop.  
 Native of Europe.
- 3-FASCIATA.** Black; wing-cafes with three yellow bands, the first interrupted. Fabr.  
 Antennæ pale ash, with the base black; first band on the wing-cafes composed of two dots, the second with a small tooth, the third lunated. Inhabits Sweden and Germany.
- RETICULATA.** Black; wing-cafes testaceous at the base, reticulated with yellow, and tipped with black. Fabr.  
 Native of Italy. The antennæ black; joints at the base yellow; legs rufous, with black joints.
- SERICEA.** Green-blue; wing-cafes somewhat fastigate. Fabr.  
 This and the seven following inhabit Europe.
- COLLARIS.** Thorax globular, and with the abdomen red; wing-cafes black. Fabr.
- VIRGINEA.** Thorax globular and black; wing-cafes violet; abdomen rufous. Oliv.

## LEPTURA.

**CARBONARIA.** Black; wing-cafes testaceous; tipped with brown. Linn.

Native of Africa. Antennæ yellowish at the base; thorax and wing-cafes smooth.

**LUTEICORNIS.** Yellow; thorax with two black lines; wing-cafes with four black bands. Fabr.

Inhabits Carolina. Head and antennæ yellow; legs yellow; posterior thighs with a black ring.

**4-PUSTULATA.** Black; wing-cafes with two remote ferruginous spots. Fabr.

Native of Sweden.

**8-MACULATA.** Black; wing-cafes livid, with four black spots. Schæff.

An European species.

**INTERROGATIONIS.** Black; wing-cafes yellow, with a longitudinal curved black line, and four marginal spots. Linn. Donov. Br. Inf.

Native of the northern parts of Europe.

**MARGINELLA.** Blackish; future of the wing-cafes, two marginal spots, and tip yellow. Fabr.

An inhabitant of Italy.

**6-MACULATA.** Black; wing-cafes testaceous, with three indented black bands, the anterior one a little interrupted. Schæff. &c.

Native of Europe.

**7-PUNCTATA.** Black; thorax testaceous, with a black dot; wing-cafes testaceous, with seven black dots. Fabr.

Small, linear; head with a large frontal testaceous spot; abdomen testaceous; legs black. Native of Hungary.

**12-MACULATA.** Black; wing-cafes yellow, with six large black spots on each. Fabr.

Native of Siberia.

**ATTENUATA.** Wing-cafes tapering, yellow, with four black bands; legs testaceous. Schæff.

Inhabits Europe; abdomen entirely black, or rufous, with the tip black.

**CALCARATA.** Black; wing-cafes tapering, yellow, with four black bands, the first punctured, second interrupted; posterior shanks bidentated. Herbit.

**NIPELLA.** Black; wing-cafes testaceous; anterior shanks rufous. Linn.

**ERYTHROPUS.** Black; legs red; base of the thighs, tips of the shanks, and ends of the legs black. Linn.

**5-MACULATA.** Black; antennæ annulated with black; legs and wing-cafes testaceous, the latter with five black spots and three bands. Linn.

**FUSCA.** Brown, with golden down; base of the antennæ testaceous; fore thighs and shanks testaceous, the former with four testaceous bands, the latter testaceous at the base. Linn.

**MORIO.** Thorax orbicular; body entirely black and polished. Fabr.

Native of Sweden.

**CERAMEYCIFORMIS.** Black, with whitish down; wing-cafes yellowish, with five black spots and a line in the middle. Herbit.

Found in Hungary and Austria.

**RUSSICA.** Black, with whitish down; wing-cafes yellowish, with five black spots and a line in the middle. Herbit.

Inhabits Russia.

**LÆVIS.** Black, beneath silky; antennæ yellowish-brown; anterior legs ferruginous. Herbit.

Native of Pomerania.

**SOLSTITIALIS.** Black; antennæ ferruginous at the base;

legs and wing-cafes yellow, the latter edged with black. Herbit.

Inhabits Prussia.

**4-NOTATA.** Black, with yellowish down, beneath with whitish; antennæ brown at the base; thighs ferruginous at the base; wing-cafes punctured with two orange spots. Herbit.

Same country as the preceding.

**SPLENDIDA.** Black, with yellow down; wing-cafes glabrous at the tip; legs fulvous; antennæ brown, with ferruginous base. Herbit.

Inhabits Germany.

**PLUMIPES.** Brown, punctured; thighs subclavated; hind-legs very long, the shank; rufous at the tip. Pallas.

Country unknown.

**RUFIPES.** Black; legs rufous; thighs black at the base. Schaller:

Native of Germany.

**OCTO-MACULATA.** Black; wing-cafes testaceous, with six black spots and tip. Schaller.

Inhabits Saxony.

**SCIALELLI.** Brown; base of the shells with four rufous spots. Schaller.

Inhabits Germany.

**PUMILA.** Brown; anterior legs testaceous, the thighs black above. Schaller.

Native of Saxony. A rare species, found on rhamnus catharticus.

**USTULATA.** Black; thorax and wing-cafes testaceous, tipped with black; legs testaceous.

Inhabits Germany on flowers.

**PARISINA.** Black; base of the antennæ and thighs reddish. Thunb.

Oblong, narrow. Inhabits Germany.

**BIPUSTULATA.** Wing-cafes black, striated with dots, and marked with two testaceous spots. Thunberg.

Inhabits Upsal.

**SCOPOLI.** Abdomen and thorax at the posterior margin red; wing-cafes testaceous, pellucid, and attenuated; tip and margin below the middle black. Scop.

**NIGRIPES.** Black; wing-cafes dull yellow-testaceous; legs black. Gmel. Degeer, &c.

Country unknown.

**VERNA.** Black; anterior shanks fulvous. Müll.

Native of Denmark.

**MACULOSA.** Black; wing-cafes livid-testaceous; antennæ spotted with black. Degeer.

Country unknown.

**LUNCLATA.** Black; thorax with a narrow yellow band behind; wing-cafes with two ferruginous lunules. Swederus.

Inhabits the Cape of Good Hope.

**BICOLORATA.** Pale ferruginous; eyes, wing-cafes, wings, and tail above black. *Leptura bicolor*, Swederus.

Native of America.

**VITTATA.** Pale testaceous; antennæ annulated with fulvous; wing-cafes dotted with black, with four yellow stripes. Swederus.

Inhabits America.

**10-PUNCTATA.** Black; thorax subglobular; wing-cafes with ten dots. Lepech.

Inhabits Ural.

**VARIA.** Villous, hoary; thorax subglobular; wing-cafes black with white dots, and four interrupted bands. Lepech.

Same country as the former.

**VIRIDIS.** Greenish; thorax somewhat ovate, with two darker lines; and the black back. Lepelet.

Native of Siberia.

**NIPTENS.** Thorax globular, and with the abdomen black, with yellow shining down; wing-cafes black, with four broad yellow bands; legs ferruginous. Forster.

Inhabits North America.

**BILINEATA.** Blackish-brown; thorax with two yellowish lines; wing-cafes with scattered dots. Scop.

Found in Carniola.

**CERULEA.** Blue; anterior flanks rufous. Scop.

Native of Italy.

**SQUALIDA.** Black; wing-cafes testaceous at the base and inner margin. Scop.

Same country as the former.

**BIPARTITA.** Black; thorax ferruginous with a black line; wing-cafes with a common ferruginous spot. Schrank.

This and the two following are natives of Germany.

**FERRUGINEA.** Black; wing-cafes ferruginous, with a broad patch of black. Schrank.

**LAMBDA.** Black; wing-cafes with three white bands. Schrank.

**MACULATA.** Black, with yellow downy spots; thorax globular; antennae half as long as the body. Geoffr.

This and the five following are inhabitants of France.

**NÆVIA.** Black, with yellow down; wing-cafes with two black glabrous spots. Geoffr.

**PUNCTULATA.** Blackish; head and thorax red, dotted with black. Geoffr.

**STRIGOSA.** Yellow downy; wing-cafes with three narrow black bands. Geoffr.

**GALLICA.** Blue; flanks rufous; thorax subglobular. Geoffr.

**CRASSIPES.** Deep black; thighs thick and rufous. Geoffr.

**BIMACULATA.** Rufous; thorax cylindrical; wing-cafes dotted, with a spot and waved line of white. Müll.

Inhabits Europe.

**VILLOSA.** Black, villous; thorax cylindrical, with pale longitudinal line. Müll.

Native of Denmark.

**LEPTURUS,** in *Botany*, from  $\lambda\epsilon\upsilon\tau\acute{o}\varsigma$ , slender, and  $\rho\upsilon\tau\tau\alpha$ , the tail of an animal, a genus of grasses, established by Mr. Brown, Prodr. Nov. Holl. v. 1. 207, and so called from its long slender cylindrical spike. It is founded on *Rottbolla repens*, Forst. Prodr. 9. u. 50, with a question whether *R. incurvata* of Linnaeus and Fl. Brit., as well as *R. filiformis* of Roth, may not belong to the same. The chief difference between *Lepturus* and *Rottbolla* seems to lie in the joints of the spike being single-flowered in the former, two-flowered in the latter; for in the detail of the florets, respecting the presence or imperfection of the parts of impregnation, this tribe of grasses, and indeed all grasses, are to be trusted with great caution.

**LEPTURUS,** in *Ichthyol.* The name is of Greek origin, and is formed of  $\lambda\epsilon\upsilon\tau\acute{o}\varsigma$ , slender, and  $\rho\upsilon\tau\tau\alpha$ , a tail, expressing that the fish bearing this name has a very long and slender tail. See *TRICHLURUS lepturus*.

**LEPTURUS,** in *Ornithology*. See *PHÆTON æthereus*.

**LEPUS,** the Hare, in *Astronomy*, a constellation of the southern hemisphere; whose stars in Ptolemy's catalogue are twelve; in that of Tycho thirteen; in the Britannic catalogue nineteen. See *CONSTELLATION*.

**LEPUS Aquæ,** the water-hare, in *Ornithology*, a name given to the crested diver, or colymbus of America, which is the same species with the large European kind, though

described by many authors as a different bird. It has the name of the *sea-hare* or *water-hare*, from its great nimbleness in the water. It is caught with much difficulty; and the Mexicans have a thousand fabulous stories about it. See *COLYMBUS cristatus*.

**LEPUS,** in *Zoology*, a genus of the order of Glires, in the class of Mammalia, the characters of which are that the animals of this genus have two fore-teeth in each jaw; in the upper jaw is a second inner row of fore-teeth, which are considerably smaller than the outer or primaries; the fore-teeth have each five, and the hind-feet four toes. These animals are very timid; they live on vegetable food; and they use the hind-feet in walking as far as the heel, running by a kind of leaps, or repeated bounds. They have either exceedingly short tails, named *cuts*, or none at all.

\* With tails.

1. *L. Viscacia, Vizcacha, Viscachos*, the Peruvian hare, with a longish tail, beset with bristles. Molin. Hist. Nat. Chil. Hares of this species inhabit the plains and bases of mountains in the colder parts of Peru and Chili. The fur is of a mouse colour, and so fine and soft, that, in the time of the Incas, it was woven into cloth for the Peruvian nobles, and is that employed for bonnets by the Chilese. In habit and manner this species resembles the rabbit, and digs holes under ground, in which are two contiguous chambers, one in which it sleeps, and the other, which is lower, is employed for eating its provisions, that are collected in the night; the tail is bushy, and much longer than that of any other species, and in general it turns up and is used as a weapon of defence.

2. *L. Timidus*, common hare, has a very short tail, the ears longer than the head, and black at the ends. Of this there are two varieties, viz. the horned common hare, *L. timidus cornutus*, having slightly branched horns, an animal probably fabulous; and the yellow common hare, *L. timidus melinus*, of a straw colour, of the same size with the hare, and running like it. Cook's Voy. iii. Pennant's Quad.

This species inhabits the whole of Europe, and more plentifully in Bulgaria; in the northern parts of Persia, Japan, Ceylon, and almost the whole of Asia; in Egypt and Barbary; in North America, and even in Chili. The hare is very timid, very quick in its sight and hearing, and very swift, particularly in running up hill; when hunted it runs circularly, gradually lessening the circuit, and often doubling back parallel to its path, and leaping through a great interval at the turn, in order to throw off the dogs. (See *Hare HUNTING*.) The hare feeds only by night, and chiefly on the twigs and bark of shrubs and young trees. It is hunted for sport with dogs or hawks, and, in India, with some species of the cat genus. It is said to be found of the found of a drum; it is much infested with fleas; it does not burrow, but makes a kind of nest, called by sportsmen a "form," among bushes or long grass; its urine is fetid, which it takes care not to discharge in its nest. It does not pair, but breeds often in the summer and spring, the male pursuing the female, when in season, by the scent; after going 30 or 31 days, the female brings three or four at a litter; and as hares are very lascivious, superfecundation is not uncommon. It is about two feet in length, when full grown between eight and nine pounds in weight, sometimes, though rarely, twelve; the head is oblong or oval; the ears long and tipped with black, the eyes large, prominent, and black, placed much outwards, and provided with a nictitating membrane, which remains open when the animal is asleep; the upper

## L E P U S.

lip is divided; the snout furnished with long white whiskers, the chin white; the fur on the face, back, and sides white at the roots, black in the middle, and tawny red at the ends; the breast and throat are reddish; the belly is white; the tail is black above and white beneath; the hind thighs are long, thick, and fleshy, with a cavity on each side at the pubes; the feet are thickly covered with hair on the soles. This animal is fond of birch, parsley, and pinks. Its flesh was forbidden by the Druids, but much esteemed by the Romans. For other particulars, see HARE.

3. *L. Variabilis*, varying hare, *Alpine hare*, has a very short tail, the ears shorter than the head; the whole fur becomes white in winter, except the tips of the ears, which remain black. Of this species there is a variety, called the *L. variabilis hybridus*, or spurious varying hare, the sides of which only turn white in winter. This species inhabits the coldest and most hilly parts of Europe and Asia, as Scotland, Norway, Lapland, Russia, Siberia, Kamtschatka, Greenland, and in America, about Hudson's bay, and Labrador. The spurious variety is a mixed breed, between the varying and common species, sustaining a partial change of colour, and found only in the southern and western parts of Siberia. In autumn the varying hares sometimes collect in flocks of 5 or 600: driven from the mountains of Russia and Siberia, they migrate in quest of subsistence into the lower country, and return in spring. The flesh of this species is harder, drier, and less flavoured than that of the common kind. It never mixes with the common species, but keeps on the tops of the highest hills; it does not run swiftly, but when pursued, takes shelter in the clefts of rocks; is easily tamed and very frolicsome; fond of honey and sweatmeats; it eats its own dung before a storm; changes to white in September, and recovers its grey colour in April; and it is subject to these changes when kept in a warm room; in Greenland, it is always white. Penn. Quad. Arctic Zool. Forster. Phil. Trans. lxii.

4. *L. Niger*, the black hare, has a very short tail, fur entirely black, or very dark tawny, the whole year, and inhabits Siberia, and the government of Cassan. It is much larger than the common kind, and very glossy.

5. *L. Americanus*, American hare, Hudson's bay hare, Hudson's bay quadruped, Phil. Trans. lxii. with the tips of the ears and tail grey, has a very short tail. The hind legs are a half longer than the body; the tips of the ears and tail grey. This species inhabits North America. In New England, Canada, and farther north, this species acquires a long, silky, silver-white coat of fur during winter, the edges of the ears only remaining grey: to the south it retains the whole year a short fur of an ash colour, mixed with rusty and black, on the neck and body, the legs pale-ash colour, and the belly white. It is smaller than the common hare, shelters in hollow trees and under fallen timber, and breeds once or twice a year, producing from five to seven at a litter; the fore legs are proportionally shorter, and the hind legs considerably longer than those of the common kind.

6. *L. Talai* of Buffon, Baikal hare of Pennant, the Daurian hare of Erxleb, the *cinclus leporinus* of J. G. Gmelin, has a short tail, and the edges of the ears black. This species inhabits the country beyond the lake Baikal, in the desert of Gobi or Cobi, and as far as Thibet. This is larger than the former species; in summer of much the same colour with the varying hare, and in winter a little paler; the legs are smaller and the hind legs longer; the tail longer than that of a rabbit, but shorter than that of the common hare, and like that black, especially at the root. It does not burrow, runs straight forward when pursued,

and shelters in the holes of rocks. Its flesh is white, like that of the rabbit.

7. *L. Minimus*, Chilese hare, has a very short tail, and the ears of an uniform colour. Molina H. N. Chl. This species inhabits the kingdom of Chili. It is small, not exceeding the size of a small rat; its body is of a conical form, its ears are small and sharp-pointed, its snout is lengthened, the fur is fine and very short; the flesh is white and good for food. It resembles the domestic rabbit in variableness of colour, in its prolific quality, producing almost every month six or seven young ones at a time; and in Chili it is domesticated.

8. *L. Capensis*, Cape hare, has a bushy tail, as long as the head, and red feet. It inhabits the country three days' journey from the Cape of Good Hope; dwells in the fissures of rocks, and does not burrow; about the size of a rabbit, and probably the same animal that is mentioned by Adanson as found in Guinea, which, he says, is smaller than the common kind, with a colour between that of a rabbit, and has white flesh.

9. *L. Cuniculus*, common rabbit, has a very short tail, almost of the same colour with the body, ears black at the points, and hind legs shorter than the body. Of this species there are the following varieties, viz. *cuniculus ferus*, or wild rabbit, of a brownish-grey colour; *cunic. domesticus niger*, of an uniform black colour; *cun. domesticus albus*, of an uniform, white colour, with fiery red eyes; *cun. domesticus variegatus* pied tame rabbit, of a pied or mottled black and white colour; *cun. domesticus argenteus*, silvery tame rabbit, of a silvery grey or ash-colour, with tawny feet. This species inhabits naturally the warmer parts of Europe, Asia, and Africa; it is not a native of Britain, but has subsisted in a wild and tame state in this country for several ages. It occupies principally dry sandy soils, in which it forms long winding burrows; confining itself to these holes in the middle of the day, and wandering in the evening, night, and morning, in search of food. It feeds on all kinds of green vegetables and grain. Its flesh is white and much esteemed. The female breeds six or seven times in a year, going 30 or 31 days with young, and bringing from four to eight at a litter: it acquires its full size in six months, and lives about eight or nine years; the male is very voracious, and apt to destroy the young; rabbits are preyed upon by hawks, badgers, and polecats, and are caught by means of terriers, nets, and ferrets. Numbers of them are bred in a wild state in places set apart for the purpose, called "warrens," and many are bred in houses in a domestic state. The wild variety is of a brown ash-colour, having the upper part of the tail black, and the under part white. The fur of the silvery variety is valuable.

10. *L. Saecatus*, hooded rabbit, Russian rabbit, has a double fold of the skin behind the head, and another under the throat. This animal's habitat is unknown. It is described by Mr. Pennant, from a drawing in the British Museum by Mr. Edwards, and called by him a Russian rabbit, but it is unknown in that empire.

11. *L. Sericus*, Angora rabbit, is covered with long, waved, silky hair. The Russian rabbit is reckoned by Gmelin a variety of this. It inhabits Angora in Asia Minor, and is exceedingly beautiful on account of its fine, white, silky fur, which is a valuable article in commerce.

\* \* Having no Tail.

12. *L. Brasiliensis*, Brazilian hare, named "Tapeti" by the natives, has very large ears, no tail, and, for the most part, a white ring or collar round the neck. (Pallas Cliv.) This species inhabits South America and Mexico; it is of

the same colour and magnitude with the common hare, but darker, with similar large ears; in its general appearance it resembles the rabbit. It lives in the woods, does not burrow, and its flesh is good food.

13. *L. Puffinus*, calling-hare of Pennant, has no tail, triangular ears, white at the edges; the upper parts of the body are dark-brown, mixed with blackish-grey, and the under parts lairy. (Schreber.) This species inhabits the southern extremity of the Ural mountains, about the Irtifich and the funny hills to the south of the Altaic chain. It feeds chiefly on the flowers and bark of the *Cytisus fupinus*, *Rubnia frutescens*, *Cerastium pumila*, and *Malus sylvestris*; digs holes in dry places, amid bushes, and leads a very retired life, near its burrows, which are long and intricate, with a very small entrance. These animals are discovered by their voice, which is very loud and sonorous, like the piping of a quail, and may be heard at a great distance; it is repeated at short intervals, three, four, or even six times, mostly at night and morning, and never in winter or bad weather. This species is gentle, and easily tamed; it sleeps little, drinks frequently, and is most active in the night season; its pace is not quick, but by leaps.

14. *L. Alpinus*, Mountain hare, Alpine hare of Pallas, &c. *Multa Daurica*, or Daurian weasel, has short rounded ears, and no tail, is of a bright bay colour, with brown ears and hind feet. (Schreber.) This animal inhabits the Altaic chain of mountains, to the extremity of Asia, and beyond the Lena and Yenisei, occupying the most rugged and inaccessible shelves of the mountains, burrowing in the clefts of the rocks, or living in the hollow trunks of decayed trees. Its voice or cry resembles a loud whistle. The mountain hare is preyed on by fables and Siberian weasels, and is much infested by the *Oestrus leporinus*, a species of gad-fly, which lodges its eggs in their skins, and often destroys them. This species varies in size from seven to nine inches in length, and weighs from  $1\frac{1}{4}$  pound to four ounces.

15. *L. Ogotona*, the Ogotona hare, or Mongolian weasel, has oblong, oval, somewhat pointed ears, of the same colour with the body, which is pale grey; but it has no tail. (Schreber.) It inhabits the mountains beyond the lake Baikal, and all Mongolia, especially the great desert of Cobi; dwelling sometimes in rocky places, among stones, or forming in the sand with two or three entrances. Its voice is sharp and clamorous; it feeds chiefly on the bark of the *Pyrus baccata*, and on the suckers of the dwarf elder, and in spring on various herbs which grow on the sandy soil. It is nimble, and scarcely capable of being tamed; it is preyed upon by various species of the weasel tribe, by the Manul cat, hawks, wood-peckers, and owls; it differs from the calling and mountain hares, chiefly in size, being about  $6\frac{1}{2}$  inches long. It procreates in spring, and the young ones are fully grown by the end of June.

LEPYRODIA, in *Botany*, λεπυροδία, *scaly*, so called on account of the inner scales at the base of each flower. Brown Prodr. Nov. Holl. v. 1. 247.—Class and order, *Dioecia Triandria*. Nat. Ord. *Tripetaloides*, Linn. *Junci*, Juss. *Raffiaceae*, Brown.

Eff. Ch. Flowers either dioecious or hermaphrodite. Petals six, nearly equal, prominent, with one or two scales at their base, within the proper scale of the spike, or catkin.—Male, Stamens three. Anthers simple, peltate. A rudiment of a pistil. Female, Styles three. Capsule of three cells, three-lobed, bursting at the prominent angles. Seeds solitary.

This genus is very near *Elegia*, Linn. Mant. 2. 162, (which was afterwards sunk in *Raffia*), but differs in the

presence of inner scales to the flowers, and in the male flowers being like the female, with nearly equal petals, as well as in having the sheaths of the stem permanent, not separating just above their base, and in the smaller size of the spathe. The *Calorophus* of Labillardiere nearly answers to the above character, but is a totally different plant.

1. *L. gracilis*. Stems somewhat branched. Sheaths tight. Spike compound; its lower branches rather distant. Three outer petals shortest.—Gathered by Mr. Brown at Port Jackson, New South Wales.

2. *L. stricta*. Stems perfectly simple. Sheaths tight. Spike compound; its branches rather crowded. Petals all nearly equal.—Native of the fourth coast of New Holland.

3. *L. fœrscifera*. Stems perfectly simple. Sheaths lax. Spike compound; its branches imbricated, divided. Three inner petals smallest. Found at Port Jackson.

4. *L. hermaphrodita*. Stems perfectly simple. Sheaths lax. Spikes nearly simple. Flowers hermaphrodite.—Found on the fourth coast of New Holland.

Our account of this genus is entirely taken from Mr. Brown's work, with some slight difference in terms, according to what we have used in the articles LEPTOCARPUS and LEPIDOSPERMA.

LERANG POINT, in *Geography*, a cape on the N. coast of the island of Java. S. lat.  $6^{\circ} 37'$ . E. long.  $111^{\circ} 27'$ .

LERAY, a town of France, in the department of the Cher, and chief place of a canton, in the district of Sancerre; 8 miles N. of Sancerre. The place contains 1109, and the canton 6544 inhabitants, on a territory of 170 kilometres, in 7 communes.

LERCHEA, in *Botany*, was so named by Linnæus, as a tribute of respect to the botanical acquisitions and publications of John James Lerche, principal physician to the Russian armies, who was born at Potsdam in the year 1703, and who died at St. Petersburg in 1780. He published a description of certain plants growing at Afrachan, and in the provinces of Persia which border on the Caspian sea. This tract is printed in the 5th vol. of the New Transactions of the Academy Naturæ Curiosorum, Appendix 161. 206. He also furnished an account of the *Nymphaea Nelumbo* of the Caspian sea. Haller mentions that Lerche made many curious observations on the agriculture and botany of the countries through which he travelled.—Linn. Mant. 155. Schreb. 453. Willd. Sp. Pl. v. 3. 586. Mart. Mill. Dict. v. 3. Jurl. 421.—Class and order, *Monadelphica Pentandria*. Nat. Ord. unknown.

Gen. Ch. Cal. Perianth of one leaf, tubular, five-toothed, permanent. Cor. of one petal, funnel-shaped; tube longer than the calyx; limb five-cleft, nearly erect. Stam. Filaments scarcely distinct from the tube of the germen; anthers five, oblong, placed upon the tube of the germen. Pist. Germen superior, somewhat ovate, terminated (within the corolla) by an obtuse tube; style within the tube of the germen, thread-shaped, the length of the stamens; stigma two or three, rather obtuse. Peric. Capsule somewhat globose, turulose, of three cells, sometimes only two. Seeds numerous.

Eff. Ch. Calyx five-toothed. Corolla funnel-shaped, five-cleft. Anthers five placed on the tube of the germen. Style single. Capsule of three cells and many seeds.

1. *L. longicauda*. Linn. Syst. Veg. ed. 14. 610. Mant. 256. There is no figure of this solitary species of *Lerchea*, which is a native of the East Indies, and a shrub of irregular growth, furnished with straggling jointed branches. Leaves opposite, on foot-stalks, lanceolate, smooth, entire, a foot in length. *Stipulas* sword-shaped, shorter than the leaf-stalks.

stalks. *Spike* terminal, slender, a foot high; *flowers* remote, scattered, small.

The above description is entirely taken from the works of Linnæus, the only person who ever saw the plant. No trace of it is to be found in his herbarium, yet it is to be presumed the specimen exists somewhere in his collection, probably without a name.

LERENZA, in *Geography*, a town of New Granada; 25 miles N. of Tunja.

LERGE, a town of Sweden, in West Gothland; 4 miles N. of Gothenburg.

LERI, JOHN DE, in *Biography*, a French Protestant minister, was born at La Margelle, a village in Burgundy, and professed his academical studies at Geneva. In 1556 he was selected to accompany two ministers, on a mission to join an intended colony of the reformed religion in Brazil, under the protection of admiral de Coligny. On their arrival, they found their project so involved with difficulties, that Leri returned to France in the following year, having endured astonishing hardships during his voyage. He afterwards was admitted to the office of the ministry, and exercised it at La Charité, at the time of the massacre of St. Bartholomew, when he was obliged to make a very hasty escape to the town of Sancerre. It was during the memorable siege of this place that he was granted a passport from marshal de la Châtre, permitting him to retire wherever he pleased; he went to Bern in Switzerland, where he was received in the most kind and hospitable manner by M. de Coligny, son of the admiral. In 1574 he published an interesting "History of the Siege of Sancerre;" giving an account of the transactions of that siege, and of the horrors of famine to which the Protestants submitted in defence of their religion, and all that was dear to them, which was widely dispersed, and went through many editions. In 1577 he published an account of his voyage to Brazil. He died at Bern in 1611, greatly regretted by all who knew him. Bayle. Moreri.

LERIA, in *Ancient Geography*, an island of the Ægean sea; one of the Sporades, according to Strabo.—Also, a town of Spain, in the Tarragonensis, and in the interior of the country of the Edetani. Ptolemy.

LERIDA, in *Geography*, anciently called *Ilerda*, a town of Spain, in Catalonia, distinguished in ancient and modern history for the great events which have rendered it memorable. It was the capital of the country of the Ilergetes long before the first invasion of Spain by the Romans, and had its own particular princes. In the plains of Lerida Scipio gained a signal victory over Hanno, the Carthaginian general, A.U.C. 537. It was, likewise, under the walls of this town that Julius Cæsar conquered the lieutenants of Pompey, A.U.C. 705. The beauty of its situation and the fertility of the country attracted the attention of the Romans; and as soon as they had made a conquest of it they planted colonies there, and gave it the title of "Municipium Ilerdense." This town, having fallen under the dominion of the Goths, embraced the Christian religion, and was the seat of a celebrated council held here A.D. 528, or 524. A council held here in 546 is remarkable for two of its canons: one prohibiting ecclesiastics from shedding human blood, and another permitting the communion to be administered to magicians when they are dying. After the conquest of the Moors, it became at first subject to the caliphs of Damascus, and afterwards to the Moorish kings of Cordova; but its own governor erecting the standard of rebellion and usurping the supreme power, it had a separate king. In 1149, Raymond Berenger, the last count of Barcelona, who had just ascended the throne

of Aragon, took Lerida from the Moors, and from that time it formed a part of Catalonia.

This town is situated on the declivity of a hill, at the top of which the castle stands, on the right and west bank of the river Segra, which bathes the walls of it. It is long, narrow, almost triangular, close, and ill built. It has one tolerable street, a quarter of a league in length, but, like the others, narrow and ill paved. A quay, lately built, extends through the whole length of the town, which forms a kind of promenade for the inhabitants. Their number is about 18,000. It is an episcopal see, suffragan to Tarragona. Its diocese includes 150 parishes; Lerida itself has one cathedral chapter, four parishes, eight convents of monks, three of nuns, one hospital, and one college. The town has a civil and military governor, a small garrison, and an alcade-major for the administration of justice. Its university, established in 1300, by James II., king of Aragon, was suppressed by Philip V. at the commencement of the eighteenth century. The cathedral is the only edifice in Lerida that claims attention. Lerida formerly carried on a trade in salt-fish, which has wholly failed. Its present commerce is confined to the exportation of some productions of the land, chiefly fruits and pot-herbs; great quantities of which are sent to Urgel and Aragon. The adjacent country is very fertile, and valuable on account of the variety and abundance of its produce; consisting of wheat, oats, flax, hemp, oil, wine, beans, and all kinds of excellent fruits and pot-herbs. The country is intersected with canals supplied by neighbouring rivers, and is skilfully and carefully watered. Some silk-worms are also bred here, but in no great number; 62 miles E. of Saragossa. N. lat. 41° 29'. E. long. 0° 25'.

LERIKA, a town of Swedish Lapland; 100 miles W.N.W. of Tornea.

LERILLON, a small island in the Grecian Archipelago, near the N. coast of the island of Lero.

LERIN, a town of Spain, in Navarre; 15 miles E. of Estello.

LERINA, in *Ancient Geography*, *Lerins*, an island of the Mediterranean, upon the coast of Gallia Narbonensis, S.W. of Nicæa. Strabo, who calls it "Planasia," from its form and situation, says that it had a garrison.

LERINS, in *Geography*, a name given to two small islands in the Mediterranean, near the coast of France, about six miles S. of Antibes; called "St. Marguerite" and "St. Honorat;" near these are some other islets.

LERMA, a dismantled town of Spain, in Old Castile, on the Arlanza; 23 miles S. of Burgos.—Also, a town of Mexico, in the province of Yucatan; 12 miles S. of Campeachy.

LERNA, in *Ancient Geography*, a lake or marsh, now called "Molini," in the Argolide, a little N. of Genesum. It is rendered famous by the fable of the defeat of the hydra with many heads, which retired hither and was killed by Hercules. The people of the country pretend that near this lake Neptune ran away with Proserpine; in memory of which event were annually celebrated the mysteries consecrated to Ceres: and hence these mysteries were denominated the "Lernæan mysteries." Near the lake was a wood consecrated to this goddess, which commenced at mount Pontinus. Pausan. Corinth. l. ii. c. 36.

LERNÆA, in *Zoology*, a genus of the class Vermes, and order Mollusca, which is characterized by Linnæus as having an oblong, somewhat cylindrical and naked body; tentacles or arms two, or sometimes three on each side and round, by which it affixes itself to any substance; two ovaries projecting like tails from the lower extremity. They are without eyes.

eyes, and are very troublesome to fish, adhering very firmly to them, chiefly to the gills and fins. There are fifteen species, which we shall briefly enumerate.

## Species.

**BRANCHIALIS** is one of the largest, being about two inches in length. The body is round and flexuous, the mouth is lateral, and feated between three slightly branched horns. It inhabits the northern seas, and is found adhering to the gills of cod-fish. It is used as food by the Greenlanders. Müll. Zool.

The body of this species is hollow, membranaceous, thicker before and behind; dull white, dirty red. The neck is long, tubular, and filiform; tail ending in a perpendicular groove; ovaries two, composed of long twilted cirri.

**CYPRINACHA**. Body cylindrical, clavate behind; thorax forked; tentacula lunate at the tip. It has four tentacula, two of them lunate at the tips; it is only about half an inch long, and of the thickness of a small straw; the body is rounded, of a pale greyish-white, glossy on the surface, and somewhat pellucid; it is thrust out of a kind of sheath at the base, which is of a white colour, and a thick skin; towards the other extremity of the body there are three obtuse tubercles, one of which is much larger than the rest. It is found on the sides of the bream, carp, and roach of our ponds and rivers, in abundance.

**SALMONEA**, or *Salmon loafe*. Body obovate; thorax inversely heart-shaped; tentacula two linear and approaching each other. It is rather more than half an inch long, and is found, as its name imports, adhering to the salmon about its gills. Barbut.

The body is pale and soft, head small, oblong, rather convex, with two horizontal lips; the upper one is armed with two rigid moveable hooks, the lower short, bifid; abdomen inversely ovate; ovaries round, granulate within, and as large as the whole body.

**ASSELLINA** has a lunated body, and cordated thorax, and is found in the gills of cod-fish and ling. Barbut.

**HUCHONIS**. Body knotty; two tentacula; ovary double and united behind; is found in the gills of the salmo hucho, in northern lakes and rivers. The body is clear white and somewhat cartilaginous.

**CLAVATA**. Body cylindrical, subinuate and tripled beneath the tip and snout. Müll. It is found in the fins, gills, and eyes of the Perca Norvegica.

**UNCIATA**. Body rather heart-shaped; snout simple, curved, and the mouth terminal. Müll. It is found on the gills and fins of cod-fish in the Greenland seas. The body is soft, pale, with a longitudinal groove down the middle of the back; the ovaries are rounded and thickened towards the tip.

**GOBINA**. Body rhomboid; it has two arms before and two behind, all of which are nodose; the head is armed with two curved horns. Shaw. Müll. It inhabits the gills of the Cottus gobio, or Miller's thumb, and is nearly three quarters of an inch in length.

Body bluish-white; head roundish, with two incurved horns; the mouth is placed between the horns, and is furnished with three lips; the tentacula are angular, curved, knotty; intestines translucent above; tail bifid; ovaries spiral, round, subulate.

**RADIATA** has a square depressed body, with three pair of arms and four horns. Müll. It is found in and about the mouth of the *Coryphæna rupestris*, in the Greenland seas. It is rather more than an inch in length; whitish or cinereous, and rough with hardish tubercles; the sides a little

crenate; head depressed, rounded, and covered with numerous papillæ; ovaries large, oboval.

**NOIOSA**. Body square tuberculate; with two very short arms beneath on each side. Müll. Shaw. It inhabits about the mouth of the Perca Norvegica.

Body soft, pale cinereous, convex above, and concave beneath, with four hard white tubercles in the middle of the back, and five white teeth on each side; head rounded, and divided by a break in the middle.

**CORNUTA**. Body oblong, with four straight emarginate arms; head fubovate. Shaw. Müll. It is found on some species of the Pleuronectes.

Body covered with a pellucid skin; front with two horns and a single tooth; the mouth has two feelers; ovaries brown, and its eggs are of a tawny colour.

**PECTORALIS**. Head orbicular; hemispherical; abdomen obovate, with a terminal truncate papilla. Müll. Shaw. It is found on the gill and pectoral fins of the flounder, or Pleuronectes flesus, and other species of the same genus.

Body white, diaphanous, covered with small blackish spots; the crown has two falciform projections; snout conic, truncate, with four minute horns, two short spines, and two feelers near the third conic spine. Two tentacula, not curved; ovaries two, rather narrow, sub-annulate, and of equal diameters.

**LOTÆ**, found on the gills of the *Gadus lota*, has four unequal ovaries; the mouth has two hooks; four cruciate appendages.

**CYCLOPTERINA**. Body round, flexuous, with a double orifice in the middle of the snout; snout terminated by three horns, divided into three parts. It inhabits a species of the Cyclopterus, or Lump-fish.

Body resembles the branchialis above described, but the horn is slender, turned up and entire at the tip; tail is narrower, with two convex lobes on each side; ovaries simple, spiral, and nearly five inches long when extended. There is another variety which is rather less and has greenish ovaries.

**PINNARUM** is of a reddish colour; head cylindrical and rostrate on the fore-part; it has two tentacula, which are lunate, and bifid at the tip. It is found on the dorsal fins of the *Gadus barbatus*.

Body depressed, fleshy, grooved on the back, with a cylindrical arm placed on the fore-part of the back, concealed in a groove; the ovaries long and cylindrical.

**LERNEB**, in *Geography*, a town of Algiers; 20 miles S. of Tipa.

**LERO**, anciently *Lero*, or *Leros*, an island of the Grecian Archipelago, N.N.W. of that of *Calamo* (which see). Strabo says that it was formerly inhabited by a colony of Milesians. It is about eight miles long, and two broad. It has a good harbour and a few coves, and also high mountains, in whose bosoms mines and quarries of marble might be worked; its soil is ungrateful, and its inhabitants are under the necessity of seeking succours abroad by navigation and traffic. N. lat. 37° 12'. E. long. 26° 35'.

**LERONA**, a town of Italy, in the Orvietan; 7 miles N.W. of Orvieto.

**LEROT**, or *Garden Squirrel* of Buffon, in *Zoology*. See *MYOXUS Nitela*.

**LE ROY le veu**, a form of words, by which the royal assent is signified by the clerk of the parliament to public bills; to private bills this assent is expressed by *soit fait comme il est désiré*.

**LE ROY s'avoiera**. By these words to a bill, presented to the king by his parliament, is understood his absolute

denial of that bill in a more civil way; and the bill thereby becomes wholly null and void. See ROYAL, and PARLIAMENT.

**LERVADILLA**, in *Geography*, a town of Spain, in the province of Leon; 12 miles S. E. of Ciudad Rodrigo.

**LERWIA**, or **LERWEE**, in *Zoology*. See ANTELOPE *Lervia*.

**LERWICK**, in *Geography*, a sea-port town, situated in a parish of the same name, on the east side of the Mainland of the Shetland Isles. It is distinguished as the seat of the courts held by the sheriff-depute of this shewartry, and as the general rendezvous of all the vessels employed in the whale-fishery. The harbour is one of the safest and largest in Great Britain. It is formed by the island of Bressay, and is particularly commodious from the circumstance of having two entries, one from the south, and another from the north. On the outside of the north entrance is a sunk rock, which is called the Unicorn. It derived its name from the Unicorn man-of-war, which was sent in pursuit of the earl of Bothwell, when that nobleman fled to Shetland. As this vessel appeared at the mouth of the fourth entry, before her approach was discovered by the earl, he with difficulty escaped by the north passage. The Unicorn eagerly pursued, but having no pilot on board, she struck upon this rock and was wrecked. The town of Lerwick is about half a mile in length, and is irregularly built, but contains several excellent houses. Near the north end is a small fortification, called Fort Charlotte. It is usually garrisoned by a party of invalids, and serves to protect the north entry of the harbour. About a mile and a half from the town are the remains of two ancient Danish castles. The parish extends about six miles along the coast, but at no point is more than one in bread h. The surface of the ground is for the most part rocky and mountainous. Immediately upon the shore, however, there are many very fine arable fields, the soil of which, though light and sandy, possesses considerable fertility. The population of the whole parish, according to the parliamentary returns in 1800, amounted to 1706 persons; about 900 of whom are resident in the town. Sinclair's Statistical Account of Scotland, vol. iii. communicated by the Rev. James Sands.

**LESARA**, a small island in the Baltic, E. of Aland. N. lat. 60° 18'. E. long. 20° 19'.

**LESBIAN CYNAMIUM**. See CYNAMIUM.

**LESBIUM MARMOR**, a name given by the ancients to a species of marble of a bluish-white, sometimes used for the vases and other ornamental works, but principally in the walls of public buildings.

**LESBONAX**, in *Biography*, a native of Mitylene, who flourished in the first century of the Christian era, was a disciple of Timocrates, afterwards became a teacher of philosophy in his native city, and obtained a great number of scholars. He was author of many books of philosophy, and Plotinus says he had read sixteen orations written by him. Two of these, it is supposed, have reached modern times, and were first published by Aldus, in his edition of the ancient orators, in 1513. They were afterwards published by Henry Stephens, with the orations of Æschines, Lyfias, and others. They were also published, in 1619, by Gruter. Lesbosax is said to have been the author of a treatise "De Figuris Grammaticis." He left a son named Potamon, an eminent rhetorician at Rome, in the reign of the emperor Tiberius. So sensible were the magistrates of Mitylene of his merits, and of the utility of his labours, that they caused a medal to be struck in his honour: one of which was discovered in the fourth of France about four-

score years ago, and an engraving of it published in 1744, by M. Cary, of the Academy of Marseilles. Moreri.

**LESBOS**, in *Ancient Geography*, now called *Metelin*, an island of the Grecian Archipelago, situated N. E. and S. W. and occupying in its length the port of the gulf of Adramyttium, on the coast of Asia Minor. It extended in latitude from 39° 5' to 39° 30', S. E. of the island of Lemnos. It is said, that the Pelagi first settled themselves in this island under the conduct of Xanthus, son of Triopus, king of the Pelagi, driven from Argos, who passed from Lycia to this island, called Iffa, and named by him Pelagia. Seven generations after this time, the inhabitants perished in the deluge of Deucalion, or rather in an inundation that overwhelmed this island. It was then left desolate. In process of time Maccareus, an inhabitant of Ionia, afterwards denominated Achaia, formed an establishment in this island. This prince was accompanied with Ionians and some other people of different nations. Lesbos, it is said, came hither some time after Maccareus, his progenitor.

Eustathius, in his Commentary on the third book of the Odysee, says, that this island contained five towns, viz. Lesbos, whence it derived its name, Antilla or Iffa, Pyrrha, Methymna, and Mitylene, whence this island has been since called Mitylene and Metelin. This last town was the capital. Lesbos, originally governed by rulers chosen among its own inhabitants, became afterwards subject to the dominion of foreign tyrants. It successively passed under the dominion of the Persians, and then under that of the Greeks, till its liberty was restored to it by Alexander the Great. This liberty it preserved till the time of Pompey, who reduced it into the state of a Roman province; continuing, however, for some time to Mitylene its ancient privileges. The Crusaders next established themselves for a certain period, and the Genoese were masters of it when the empire of the East fell into the hands of the Turks. It was on this occasion that Mahomet II. ten years after the capture of Constantinople, equipped a considerable fleet in order to subdue it. Mitylene, Methymna, and most of the places of this island had been well fortified; the knights of Rhodes succoured it; and the inhabitants, who knew the cruelties committed by the Turks at the capture of Constantinople, were all disposed to defend their lives. The Ottoman forces, although very considerable, would undoubtedly have miscarried against thousands of heroes, if these heroes had not been betrayed by the treachery of Lucco Gattiluso, who thought of obtaining the sovereignty of the island by delivering it up to Mahomet. Accordingly, he persuaded his cousin Gattiluso to sign a shameful capitulation. However, as a recompence for the treachery of the one, and for the weakness of the other, Mahomet caused them to be cruelly put to death a short time after. Lesbos gave birth to several persons of distinction; among whom we may reckon Alceus, a lyric poet, who long declaimed against tyranny; Sappho, the celebrated poetess, whom antiquity has placed among the Muses, and who, by an unfortunate passion, was impelled to precipitate herself from the promontory Leucates; Theophrastus, a disciple of Plato and Aristotle; Pittacus, whom Greece reckons among her sages, and who, more ardently desirous of the happiness of his fellow-citizens than of his own, conceived and executed the project of usurping power in order to restore liberty to his country; and lastly, Potamon, born at Mitylene, a distinguished rhetorician, who lived at Rome under Tiberius. This latter, wishing to return to his country, and there establish a chair of eloquence, obtained from Tiberius letters, in which it was expressly mentioned, that whoever should dare to insult Potamon, would insult in his person the emper-

peror himself. We might also mention, in more modern times, the two brothers, Barbarossas, sons of a porter, who from simple sailors, became famous pirates, and were afterwards, in succession, sovereigns of Algiers. The younger, appointed high admiral by Soliman I, is more known than his brother in the history of the Ottoman empire. For an account of the present state of Lesbos, see METELIN.

LESCAILLE, JAMES, in *Biography*, a Dutch printer and poet, born in 1610, was descended from a family of distinction and much consideration at Geneva, which took refuge in Holland on account of some persecution. By profession he was a printer and bookseller, and gained great reputation by the beauty and accuracy of various editions of books which he published. He was in high estimation as a poet, and was noticed by the emperor Leopold. He died in 1677, leaving behind him a daughter, Catherine, born in 1649, and so distinguished by her poetical talents, that she was called the Dutch Sappho. Her brother-in-law, Ranck, published, in 1728, a volume of her works, which contains seven tragedies, besides other pieces. She died in 1711. Moreri.

LESCANO, in *Geography*, a town of Spain, in the province of Guipuzcoa; 9 miles S.S.W. of Tolosa.

LESCAR, a town of France, in the department of the Lower Pyrenées, and chief place of a canton, in the district of Pau; 3 miles N.W. of Pau. Before the revolution, it was the see of a bishop, suffragan of Auch. The place contains 1885, and the canton 7823 inhabitants, on a territory of 177½ kilometres, in 15 communes.

LESCHERES, a town of France, in the department of the Upper Marne; 9 miles S. of Joinville.

LESCIVER, a town of Persia, in the province of Irak; 201 miles W. of Hamadan.

LESCZYN, a town of Poland, in Volhynia; 24 miles N. of Berdicow.

LESDIGUERES, FRANCIS DE BONNE, *Duke of*, in *Biography*, was born of an ancient family, in the Upper Dauphiné, in 1543. He was brought up to the military profession, and acquired, while he was yet a young man, so much reputation for skill and true courage, that he was chosen by the Calvinists of his native province their leader, after the death of Montbrun. Soon after the command devolved upon him, he took a number of provinces, and at length the capital of Grenoble. This was in the year 1590. When the duke of Savoy, taking advantage of the disturbances in France, projected an invasion of Provence and Dauphiné, Lesdigueres, who acted as an independent commander, covered the latter province with his arms. He now sent to court to demand the government of Grenoble, which Henry IV. could not grant him, as he had, by the advice of his council, reserved it for a Catholic; the envoy being refused his request, he applied to the council assembled, "Gentlemen, if you do not think it proper that my master should have this government, you should think of the means of taking it from him." This energetic answer was not displeasing to the king, who was glad to be under the necessity of promoting a general of the Protestant persuasion. Lesdigueres was, from this time, appointed lieutenant-general of the king's armies in Piedmont, Savoy, and Dauphiné, and by his vigilance and activity disappointed all attempts of the duke of Savoy, who was accustomed to call him the fox of Dauphiné. When that prince was constructing a strong fort on the French territory, Lesdigueres was reproached by the king for allowing it, to which he replied, "Your majesty has occasion for a good fortress to bridle that of Montmelian. Since the duke of Savoy is willing to build one at his ex-

pence, let him do it: I engage, as soon as it is completed, and furnished with cannon and ammunition, to take it from him." He performed his promise, and his services were rewarded, in 1608, with the staff of a marshal of France, and his estate of Lesdigueres was erected into a dukedom and peerage. In the succeeding reign he saved his old antagonists, the duke of Savoy, when attacked by the armies of Spain. In 1620, when the civil war was renewed, he received great offers from his party, the Calvinists, to accept the post of commander-in-chief, but he preserved his fidelity to the king, and accompanied him into the field. Upon the death of the constable of France, nothing but his religion stood in the way of his succeeding to the high office, and this obstacle he removed by abjuring the Calvinistic creed. The patent which conferred upon him the office, gave as a reason for his appointment, that it was on account of "his having been always victorious, and never vanquished." Having apostatized from his creed, probably for the sake of honours and wealth, of which he was exceedingly avaricious, he did not hesitate to take the command against his party, and was uniformly successful in the service, till his death, in 1626, when he had attained to the age of eighty-four. Notwithstanding his defects, Lesdigueres had a great mind: while leader of the Calvinists, his principal domestic was bribed to assassinate him: the plot was discovered, and taking the man aside, he ordered him to arm, at the same time he armed himself: "Since you have promised," said he, "to kill me, try to do it now, and do not forfeit your character for valour by an act of cowardice." The man threw himself at his feet, confessed his crime, and the general not only pardoned, but continued to employ him.

LESIGNA, in *Geography*, a town of France, in the department of the Aude; 11 miles W. of Narbonne.

LESINA, anciently *Pharos*, an island in the Adriatic, between Brazza and Corzola Nigra, about 44 miles long, and 5—8 broad, lying from W. to E. in N. lat. 43° 30'. In the highest parts it is rocky and barren, but nevertheless contains some good land, yielding abundance of corn. Its principal productions are also wine, oil, figs, almonds, saffron, honey, aloes, oranges, wool, cheese, and salt. Marble, in great quantities, is found on the island. Salt-fish is the chief article of commerce. Its capital is *Lefina*; which is a small, fortified town, at the bottom of a bay near Cape Pellegrino, the see of a bishop, and residence of a governor, with a capacious and safe harbour. The number of inhabitants is reckoned about 1200; 20 miles S. of Spalatro. N. lat. 43° 5'. E. long. 16° 50'.—Also, a town of Naples, in Capitanata, the see of a bishop, suffragan of Benevento, on a lake of the same name communicating with the Adriatic; almost totally destroyed in 1627 by an earthquake; 26 miles N.W. of Manfredonia. N. lat. 41° 59'. E. long. 14° 30'.

LESKAU, a town of Bohemia, in the circle of Pilsen; 7 miles E. of Plau.

LESKEA, or LESKIA, in *Botany*, an Hedwigian genus of mosses, named by its author in his *Hist. Nat. Museum Frondosorum*, v. 2. 93, in memory of his friend Leske, professor of Economy at Leipzig, and afterwards of Nat. Hist. at Marburg, who died in 1786, aged 35. This genus is by British botanists united to *Hypnum*, as agreeing therewith entirely in habit, and differing only in a very minute and uncertain character of the inner fringe, which is furnished with 16 simple teeth, instead of double or compound ones. See FRINGE OF MOSSES, and HYPNUM.

LESKEN, in *Geography*, a town of Prussia, in Pomerania; 6 miles N.N.W. of Marienburg.

LESKIRCH, a town of Tranlyvania; 14 miles W. of Fogaras.

LESKNITZ, or LESNITZ, a town of Silesia, in the principality of Oppeln; 18 miles S.E. of Oppeln. N. lat. 50° 25'. E. long. 13° 6'.

LESKO, a town of Austrian Poland, in Galicia; 48 miles S. of Lemberg.

LESKOVETZ, a town of European Turkey, in Bulgaria; 84 miles W.N.W. of Sophia.

LESLEY, JOHN, in *Biography*, bishop of Rofs, of an eminent family in the northern part of Scotland, was born in 1527. He was educated at Aberdeen, and was presented, in 1547, with a canonry in the cathedral of that city. Having obtained this preferment, he spent some years at the French universities, and took his degree of doctor of laws at Paris. In 1554, he returned to Scotland, and, taking orders, was appointed official and vicar-general of the diocese of Aberdeen. He took a most active part against the reformation, which was now taking root in Scotland; and appeared as a principal champion of the Roman Catholic party, in a disputation held between them and the reformers at Edinburgh, in 1560. When the young queen Mary was invited to return and assume the reins of government, he was sent over by the Catholics to persuade her to throw herself into the arms of the Popish party. He embarked with her at Calais in 1561; and soon after her arrival was created one of the senators of the college of justice, and privy-counsellor. Shortly after this, he was nominated to the see of Rofs. He did not confine his labours to the duties of the church, but was appointed by the queen to collect and revise the subsisting laws of the realm; and the collection printed at Edinburgh in 1566, called the black acts of parliament, from being in the black letter, was the result of its labours. When the unfortunate queen had taken refuge in England from the fury of the covenanters, and commissioners were appointed by queen Elizabeth to examine the dispute between her and her subjects, the bishop of Rofs was one of those whom Mary chose for the defence of her cause. When reasoning and argument were found to be ineffectual, he joined in conspiracies, for her deliverance, which were dangerous to the person and government of Elizabeth. He urged the duke of Norfolk to those designs which proved his ruin, and was himself involved in considerable danger: he was taken into custody, his papers searched, himself committed to the Tower, treated with the utmost rigour, threatened with capital punishment, and, after a long confinement, set at liberty, on condition that he should leave the kingdom. He accordingly went into the Netherlands, and employed himself in the most pressing solicitations to the kings of France and Spain, the German princes, and at length to the pope, in order to obtain Mary's liberation. He published several books in her defence, and in vindication of her right and title to the crown of England. In 1579, he was appointed suffragan and vicar-general of the archbishopric of Rouen; but on making his visitation of the diocese he was seized, imprisoned, and forced to purchase his liberty by a high ransom. In 1593, he was nominated to the bishopric of Constance. When there was no hope left him of returning to his own country, he retired to a monastery near Brussels, where he died in 1596. He was a man of learning, an able statesman, and a faithful servant and subject of his sovereign: his principal works, as an author, are, 1, his history, entitled "De origine, moribus, et rebus gestis Scotorum," in ten books: of these the last three books are dedicated to the queen, to whom they were presented in English, before their publication in Latin: and, 2, a geographical work, entitled "Regionum et Insularum

Scotiz Descriptio." Gen. Biog. Robertson's Hist. of Scotland.

LESLIE, JOHN, an Irish prelate in the 17th century, was born in the north of Scotland, and received the early part of his education at Aberdeen. From this place he was sent to Oxford to complete his studies. He afterwards visited Spain, Italy, Germany, and France for farther improvement, and made a proficiency in polite literature, as well as in the abstruse branches of learning. He was so great a master of the Latin, that it was said of him when in Spain "Solus Lælius Latine loquitur." He continued abroad twenty-two years, became conversant in courts, and procured the favour and friendship of many foreign princes: and on his return he was honoured with the patronage of Charles I., who admitted him into his privy-council, in which he was continued by Charles II. after the restoration. In the church of Scotland he was preferred to the bishopric of Orkney, and was translated, in 1633, to Raphoe, in Ireland. Here he built a stately palace in the form of a castle, which was found of great utility in the civil wars, as it sustained a siege, with the bishop as a kind of commander, who was, in fact, the last person who maintained the struggle in defence of the royal cause in those parts. After the restoration, he was preferred to the bishopric of Clogher. He died in 1671, being upwards of an hundred years old, and having worn the mitre more than fifty years. He wrote many curious and very learned works, which he designed for publication, but which were destroyed, together with his valuable library and MSS., the fruits of many years collection, in the civil wars. Biog. Brit.

LESLIE, CHARLES, second son of the preceding, was educated in grammar-learning at Inniskilling, and, in 1664, was admitted a fellow commoner of Trinity-college, Dublin, where he took his degrees. Upon the death of his father he came over to England, and entered himself of the Temple, at London. He soon abandoned the study of the law for that of theology, and was, in 1680, admitted into holy orders. In 1687, he was made chancellor of the cathedral church of the diocese of Connor. About this time he made himself extremely obnoxious to the Popish party in Ireland, by a zealous opposition to their doctrines, and by an earnest attachment to the Protestant religion, which he endeavoured to propagate by every means in his power. The Papists, encouraged by the reigning prince, James II., aimed at engrossing civil as well as spiritual offices; and a high-sheriff of their party was appointed for the county of Monaghan. Mr. Leslie, as a magistrate, and as conversant with the law of the land, was applied to with regard to the legality of the appointment: he instantly decided that it would be as illegal for the people to permit the sheriff to act, as it would be in him to attempt it. The magistrates, at the next quarter-sessions, inquired if the sheriffs were legally qualified, to which he replied, that "he was appointed by the king, and was of the king's religion." The answer to this was, that they boldly agreed to commit him for intrusion and a contempt of the court. Mr. Leslie, notwithstanding his attachment to the law of the land, had imbibed the doctrines of passive obedience and non-resistance, which so warped his understanding, that, at the revolution, he refused to take the oaths to William and Mary. He was, in consequence of this conduct, deprived of his preferments; and in 1689 withdrew with his family into England. Here he employed his pen in support of the cause and the party which he embraced, and was esteemed one of the ablest champions which the non-jurors had. He published an answer to the "State of the Protestants in Ireland, under the late King James's Government," by bishop, afterwards

archbishop, King. He published a weekly paper, entitled "The Rehearal," consisting of dialogues on the affairs of the times: this was continued six or seven years, when the papers were collected and published together; and it was said by bishop Burnet, that the same thread of the argument is pursued through them all, against the lawfulness of resistance in any case whatever, deriving the source of government wholly from God. Mr. Leflie wrote against Deists, Jews, Papists, Socinians, and Quakers: all his writings he afterwards collected, excepting an illiberal piece against the learned Tillotson, and published in two volumes folio. The frequent visits which he made to the continent, rendered him obnoxious to the British government; and the hatred of him was much increased by a piece, entitled "The hereditary Right of the Crown of England asserted," of which he was the reputed author. He went to Bar-le-Duc to attempt the conversion of the son of James II. to the Protestant religion, in the hope that he might one day be settled on the throne. Towards the close of queen Anne's reign, he took much pains in recommending him as her successor. The attempt was made in vain; and after the rebellion of 1715, he retired with the young Pretender to Italy. In 1721, he made up his mind to return and die in his native country; and his friends implored the protection of government, which was granted. He died at his own house in Glafough, in the county of Monaghan. He was unquestionably a man of extensive learning and great merit, and distinguished by his piety, humility, and integrity. Biog. Brit.

LESNEVEN, in *Geography*, a town of France, in the department of Finistère, and chief place of a canton, in the district of Brest; 13 miles N.E. of Brest. The place contains 2030, and the canton 16,024 inhabitants, on a territory of 167½ kilometres, in 10 communes. N. lat. 48° 34'. W. long. 4° 14'.

LESNICA, a town of Lithuania, in the palatinate of Minsk; 48 miles N.E. of Minsk.

LESNIOW, a town of Poland, in Volhynia; 18 miles S. of Lucko.

LESNO, a town in the duchy of Warfaw; 35 miles S. of Posen.

LESANDELOR, a town of Asiatic Turkey, in Cararamania; 40 miles S.S.W. of Cogni.

LESPARRE, a town of France, and principal place of a district, in the department of the Gironde; 11 miles N.N.W. of Bourdeaux. The place contains 800, and the canton 15,247 inhabitants, on a territory of 542½ kilometres, in 18 communes. N. lat. 45° 19'. W. long. 0° 50'.

LESPÉDEZA, in *Botany*, so named by Michaux, in compliment to his friend and patron Lefpedez, governor of Florida, who was very favourable to his botanical expedition through that country, though it does not appear that the governor himself was a botanist. Michaux Boreali-Amer. v. 2. 70.—This genus differs from *Hedyfarum*, see that article, in its legume, which is elliptical and turgid, smooth, of one cell, with a solitary seed. The stigma moreover is said to be capitate and somewhat conical.—The leaves are mostly ternate, rarely simple.—It appears to be a good genus, and merits further examination, for its species will probably be found rather numerous. Examples are *L. fissiflora*, (*Hedyfarum junceum*; Walter Carolin. 184. *Medicago virginica*; Linn. Sp. Pl. 1096.) a native of Virginia and Carolina: and *L. polyblacha*, Michaux, t. 40, (*Hedyfarum hirtum*; Linn. Sp. Pl. 1055.), found in Carolina and Georgia. The habit is slender and shrubby. Flowers small, purplish, in longish stalked spikes.

LESSANITZ, in *Geography*, a town of Bohemia, in the circle of Kaurzim; eight miles S.E. of Prague.

LESSAY, a town of France, in the department of the Channel, and chief place of a canton, in the district of Coutances; 11 miles N. of Coutances. The place contains 1503, and the canton 13,644 inhabitants, on a territory of 260 kilometres, in 13 communes.

LESSEE, a law term employed in leasing land, to signify the tenant. See LEASE.

LESSEES, a term used by sportsmen for the dung of a wild boar.

LESSINES, in *Geography*, a town of France, in the department of the Jemappe, and chief place of a canton, in the district of Tournay; situated on the river Dender, and celebrated for its linen manufacture; 23 miles W.S.W. of Brussels. The place contains 3037, and the canton 14,708 inhabitants, on a territory of 115 kilometres, in 11 communes.

LESSING, GOTTHOLD, EPHRAIM, in *Biography*, was born at Kamenz, in Pomcrania, in 1729. Having received the early part of his education partly at home, and partly at a boarding school, he was admitted, at the age of twelve, to the free-school of Meissen, where he remained five years, and laid in a stock of Greek and Latin. Some odes of Anacreon, which he translated at this school, were afterwards published in his works. His removal to the university of Leipzig opened a new scene to him; he paid little attention to the lectures of the professors, but studiously sought out the company of the students most distinguished for talents, and bold and singular opinions. He became a frequenter of debating clubs, and was not surpassed by any person in the societies in the originality of his sentiments, and the acuteness with which he defended them. After he had spent three years at the university, his father, who could ill bear the expence, urged him to take orders, or to pursue some profession by which he might support himself. He declined this reasonable proposal, and set about translating, and original compositions for the stage. After many changes, and much roaming about, he went to Gottenburg, where he took his degree of Master of Arts, with a view to a professorship at Gottingen, but he still continued to find support by literary employment, which consisted in translations, compilations, and some original pieces. He was a great proficient in the game of chess, a circumstance that introduced him to the acquaintance of Moses Mendelsohn; and the printer Nicolai made the third of a literary trio, who mutually sharpened each other's intellectual faculties, and influenced each other's opinions. Ramlcr the lyric poet, Sulzer the critic, and Sufimilch the satirical writer, were occasionally of their parties, and Germany perhaps could not then boast of conversations more literary and enlightened. In conjunction with Nicolai and Mendelsohn, he undertook a periodical work, entitled "The Library of Belles Lettres," which was a kind of review of works in polite literature, with original correspondence. In 1760, he was elected a member of the Academy of Berlin, and soon after was appointed secretary to general Tauenzier; his income at this period was considerable, which he spent liberally upon his relations and friends. His military associates gave him a taste for high play, which he found arguments to justify. In 1762, he accompanied his general to the siege of Schweidnitz; but after the peace, he was introduced to the king of Prussia, and then resumed his literary occupations at Berlin. Though he produced many works, yet they were not the source of much profit, and, in 1769, his circumstances were so narrow, that he was obliged to sell his library for support. At this critical juncture he met with a generous patron in Leopold, heir-apparent to the duke of Brunswick, through whose means he was appointed librarian at Wolfenbuttel.

battle. One of the fruits of this very desirable situation was a periodical publication, entitled "Contributions to Literary History," containing notices and extracts of the most remarkable MSS. The "Contributions" were made the vehicle of "Fragments of an anonymous Writer discovered in the Library at Wolfenbuttle," which consisted of direct attacks upon the Christian revelation. They occasioned a great commotion among the German theologians, and would not have been printed but for the interference of prince Leopold with the licensers of the press. In 1778 they were suppressed. Lessing, from his rising fame, and connection with prince Leopold, with whom he went on a tour to Italy, was so distinguished among the German literati, that several potentates of that country made him offers of an advantageous settlement. Nothing, however, would lead him to break his connection with his liberal patron the prince of Brunfwick, who, by his accession in 1780 to the sovereignty, was enabled to augment his favours towards him. His latter publications were "Nathan the Wise;" a second part of the same drama, entitled "The Monk of Lebanon;" and "A Dissertation on the Education of the Human Race." He died at Hamburg in the month of February, 1781. Monthly Mag.

LESSOE, in *Geography*, an island of Denmark, in the Scagerrack, nine miles long, and from one to four wide; within are some small villages, and about it some islets; about 12 miles from the coast of Jutland. N. lat. 57° 17'. E. long. 11°.

LESSOE, a town of Norway, in the province of Aggerhus; 145 miles N.N.W. of Christiania.

LESSON, in the *Manege*, is used for any piece of instruction in that art, whether given to the scholar or the horse.

LESSONS, among *Ecclesiastical Writers*, portions of the holy scripture, read in Christian churches, at the time of divine service.

In the ancient church, reading the scriptures was one part of the service of the catechumens, at which all persons were allowed to be present, in order to obtain instruction.

The church of England, in the choice of lessons, proceeds as follows; for the first lesson on ordinary days, she directs, to begin at the beginning of the year with Genesis, and to continue on, till the books of the Old Testament are read over, only omitting the Chronicles, which are for the most part the same with the books of Samuel and Kings, and other particular chapters in other books, either because they contain names of persons, places, or other matters less profitable to ordinary readers.

The course of the first lessons for Sundays is regulated after a different manner. From Advent to Septuagesima Sunday, some particular chapters of Isaiah are appointed to be read, because that book contains the clearest prophecies concerning Christ. Upon Septuagesima Sunday Genesis is begun, because that book, which treats of the fall of man, and the severe judgment of God inflicted on the world for sin, best suits with a time of repentance and mortification. After Genesis, follow chapters out of the books of the Old Testament, as they lie in order; only on festival Sundays, such as Easter, Whitunday, &c. the particular history relating to that day is appointed to be read; and on the Saints days, the church appoints lessons out of the moral books, such as Proverbs, Ecclesiastes, Ecclesiasticus, &c. as containing excellent instructions for the conduct of life.

As to the second lessons, the church observes the same course both on Sundays and week-days; reading the gospels and Acts of the Apostles in the morning, and the epistles in the evening, in the order they stand in the New Testa-

ment; excepting on faints days and holy days, when such lessons are appointed, as either explain the mystery, relate the history, or apply the example to us.

LESSONS for the *Virginal, Spinet, and Harpsichord*, have undergone great changes in the denomination and arrangement of their movements, from the time of queen Elizabeth to the present. In that prince's virginal book, now in the possession of viscount Fitzwilliam, we find *pavana* in general to be the slow movement, and *galliarida* the quick. Now and then a *fantasia*, a *coranto*, and a *gigg*; but as single movements, not parts of a suite of lessons. *Preludium*, or prelude, frequently occurs without leading to any other movement; as does *passamezzo*, *alman*, *toccata*, once; but the rest are chiefly old tunes with variations. These pieces are all written on a staff of six lines.

*Lady Nevil's Virginal Book*.—This lady was a pupil of our admirable countryman Bird; and all the lessons in her book, a thick quarto, are of his composition. They are admirably transcribed by John Baldwyne, a singing-man of Windsor, and a celebrated copyist of that time, 1591.

Its contents are; "My lady Nevil's *grounde*, with eight variations. *Qui passe*, four variations. March before the battle, 12 military movements. Old tunes varied. *Groundes* and *fancies*, with 18 pavans, and two lessons of *voluntaire*, all neatly written on four-staved paper of six lines.

Thus far all our music for keyed-instruments was in MS. But in the reign of James I. the following book appeared in print, still on six-lined paper. "Parthenia, or the Maidenhead of the first Musicke that ever was printed for the Virginals; composed by three famous Masters; William Byrde, Dr. John Bull, and Orlando Gibbons, Gentlemen of his Majesty's most illustrious Chapel. Dedicated to all the Masters and Lovers of Musick." The pieces in this collection seem to follow in *suits*, of which the first is of Bird's composition; as *preludium*, *pavana*, *galliarido*, all in G minor; then a prelude, and a *galliarido* in C; and a *pavan*, and two *galliaridos* in G, by the same.

The next author in the collection is master doctor Bull, whose pieces are arranged in the following order, "A pavan and two *galiards* in A minor; prelude, pavan, and *galiard*, in G major; two *galiards* in D minor." Orlando Gibbons' pieces have little connection, being a *galliarido* in C natural; a *fantasia* in four parts, in A minor; a pavan in do; the queen's command in C, and a *preludium* in G. This book was again engraved on copper in 1651, fol.

The title of Handel's two sets of lessons is in French, and the movements of each *suit* have the same denominations as many French composers of lessons had long used in Louis XIVth's time; as prelude, allemande, courante, gigue, with sometimes adagio, farabande, allegro, and air with *doublers*, or variations, which include all the technica of the first book.

In the second book, he has prelude, aria con variationi, minuet, chacone, and gavotta. The movements of the second book are of a lighter kind than those of the first, as the first and third set of Corelli's sonatas are called "Suonate da Chiesa," and the second and fourth sets, "Suonate da Camera."

Scarlatti's lessons are almost all single pieces, and we believe Alberti's were the first harpsichord lessons published in England, that were called sonatas. "Suonate da Cimbalo," which, without accompaniments, is still the general title of what used to be called lessons.

LESSOR, a legal term applied to the landlord, proprietor, or person who lets the land. See LEASE.

LESTANO, in *Geography*, a town of Italy, in the Friuli; 15 miles W: of Udina.

LESTI, a town of Sweden, in the government of Wafa ; 54 miles E. of Jacobitad.

LESTIBUDESIA, in *Botany*, named in honour of M. Lestiboudis, a French naturalist. Aub. d. Petit Thouars, *Plant. Ins. Afric. v. 1. 53. t. 16.* Brown. *Prodr. Nov. Holl. v. 1. 413.*

This genus is separated from *Celofia* only on account of its stigmas, which are three or four, slender and recurved, instead of being capitate or two-lobed. It includes *Celofia paniculata* and *trigyna* of Linnaeus, with some others, but Mr. Brown hints that it is probably not a natural genus, nor established on sufficient grounds. His *L. arborescens*, the only species mentioned as found in New Holland, was gathered by sir Joseph Banks in the Tropical part of that country. It has a shrubby twining stem ; elliptic-oblong, somewhat pointed, smooth leaves ; terminal as well as axillary panicles ; and three stigmas, which, according to Dr. Solander's remarks, are deeply emarginate. The manner in which the fruit bursts has not been observed.

LESTIGUANO, in *Geography*, a town of Etruria ; 27 miles W. of Volterra.

LESTOFF. See LAVESTOFF.

L'ESTRANGE, SIR ROGER, in *Geography*, was a great lover of music, and a performer. His family, one of the most ancient in Norfolk, were always great patrons of music, and musicians. Jenkins was frequently an inmate at Hunston, where, during the seventeenth century, when times were tranquil, professors and dilettanti frequently assembled to sing madrigals, and make use of several chests of viols in the performance of fancies in six parts, by the best composers of the times.

LESTRIGONS, in *Ancient Geography* and *Fabulous History*, inhabitants of Sicily towards the S.E., who are represented to have been a ferocious people. It is reported that they took Elpe, the daughter of Polyphemus the Cyclop, by force from Ulysses, who had seized her and was running away with her, and returned her to her father. If we may credit the poets, both the Lestrignons and the Cyclopes were real cannibals, who devoured fix of Ulysses's companions. The learned Bochart will have the rise of this fable to be, that the Lestrignons were anciently called Leontini, a name derived from their barbarous and cruel manners ; " à Leon-tinis moribus."

LESTWITHIAL, in *Geography*. See LÆSTWITHIAL.

LESZAISKO, a town of Austrian Poland, in Galicia ; 28 miles N.W. of Przemysl.

LET-Fall, in *Sea Language*, the word of command for putting out a sail, when the yards are aloft, and the sail is to come down from the yard ; but when the yards are stricken down, then the sail is loosed below, before they hoist the yard.

*Let-fall* is not properly said of top-fails, because they lie on the top ; and therefore the word for them is, *Heave out your top-fails*. Nor can it be applied to the mizen ; for the word is, *Strike the mizen and set it*. So that in strictness the term *let-fall* belongs only to the main-fail, fore-fail, and sprit-fail, when their yards are hoisted up aloft.

*Let-in*, in *Ship Building*, is the letting of one thing into another for support or security, as the beams into the clamps, carlings into the beams, &c. by scores being cut to receive them.

LETAC, in *Geography*, a cape on the W. coast of the island of Jersey ; six miles N.W. of St. Aubin.

LETALA, a town of Sweden, in the government of Abo ; 30 miles N.W. of Abo.

LETHAIS, a town of Mingrelia, on the Black sea ; 10 miles N. of Anaghia.

LETHAM, a town of Scotland, with a market, in the county of Fergus ; five miles E. of Forfar.

LETHARGY, in *Medicine*, ληθαργος, ληθαργια, signifying literally an *indolent forgetfulness*, (defidia obliviosa) from ληθη and αργος, is commonly used to denote an incessant and irresistible sleepiness, accompanied by an impaired state of the memory, but without delirium.

The lethargy is, in fact, a minor degree of apoplexy, and originates from the same causes, and implies a similar state of pressure on the brain, the common centre of the nervous energy, as occasions that disease. Various denominations have been given to lethargic complaints, according to the difference of the degree of severity, and some nosologists have treated of these varieties as distinct species of disease. Sauvages, for instance, has three genera of sleepy affections, *Lethargus*, *Cataphora*, and *Carus*. The cataphora he defines, a state of somnolency, from which the patient may be easily roused, without fever, delirium, or loss of memory ; the lethargy, a soporose state, from which the patient may be easily roused, accompanied with the greatest torpor of the memory and imagination, and with fever ; and *carus*, a profound sopor without snoring ; for when the snoring is present, he denominates it apoplexy. (See his *Nofol. Method. Clafs iv. Ord. 5.*) But it is obvious, as Dr. Cullen long ago observed, that these various appellations and definitions designate the same disease, in different degrees of severity ; we may, therefore, refer to the article APOPLEXY for a general view of the nature of the malady. We may observe, at present, that it originates from some *compression* upon the substance of the brain, by which its functions are impeded, and its influence on the system at large, through the medium of the nerves, obstructed ; that such compression may be occasioned by fractures of the skull, when the fractured portion of the bone is depressed inwards ; from tumours within the head ; from over-dilatation of the blood-vessels of the brain ; or from fluids effused in or upon the brain ; but that the most frequent of all these causes of compression is a plethoric state, or an accumulation and congestion of blood in the venous vessels of the head, operating, according to its degree, in producing over-dilatation or effusion.

Lethargic complaints may, therefore, both precede and succeed actual apoplexy, and are not unfrequently the forerunners of a fit. From this consideration, the importance of obviating their progress in the outset, before a rupture of the vessels of the brain, or actual effusion, takes place, must be obvious ; for, however impracticable it may be to remove the fluids so effused, or to occasion their absorption, so as to preserve the life of the patient, or to save him from an incurable palsy, if he survive ; yet, in the previous state of mere plethora of the vessels of the brain, the proper remedies may be employed with every prospect of removing the lethargic symptoms, and warding off the impending danger. The plethora may be corrected by general evacuations by blood letting, if there is an imminent threatening of apoplexy ; or by local evacuations by means of leeches, scarification, and cupping, blisters, or issues, where the danger is less imminent. At the same time, the alvine excretions should be promoted by proper laxative medicines, the diet should be light, and rather spare, and unstimulating, consisting of a large proportion of vegetable matter ; and fermented liquors of all kinds should be very sparingly taken, or altogether discarded. Exercise in the open air should be regularly performed in, and the hours appropriated to sleep shortened. In a word, a lethargy is to be considered as an impending apoplexy, or an apoplexy already begun, and to be treated accordingly. See APOPLEXY.

LETHE, ληθη, in *Ancient Mythology*, one of the five rivers

rivers of hell, signifying oblivion or forgetfulness; its waters, according to poetic fiction, having the peculiar quality of making those who drank them entirely forget every thing that was past; or, according to Virgil, "longa potant obliviam vite."

**LETHE.** *Letb*, or *Lathz*, a measure or portion of land, making one of the ancient divisions in England.

King Alfred divided England into counties, as it stands at present; those counties he subdivided into hundreds or tithings. The hundred was a division, wherein were a hundred officers to secure the peace; the *lathe* or *lathe* comprehended three or four of these hundreds.

**LETHE** was also the jurisdiction of a viscount: or a kind of assize, held once a year in each village, about Michaelmas. Whether this was instituted by Alfred, or not, is a question.

**LETHERS**, in *Geography*, a town of Hindoostan, in the circar of Sumbulpour; 16 miles W.N.W. of Sumbulpour.

**LETHRABERG**, or **LADREBERG**, a town of Denmark, in the island of Zealand; four miles S.W. of Roefchild.

**LETHUM**, in *Ancient Mythology, was distinguished by the Roman poets from *mors*, or death. See Petronius Arb. ver. 263.*

Mr. Spence conjectures, that by Lethum they meant that general principle, or source of mortality, which they supposed to have its proper residence in hell; and by *mors*, or *mortis*, the immediate cause of each particular instance of mortality on our earth. The poets give him a robe, but mention his arms being exerted out of it, as reaching at his prey. They hint at his catching people in a net, and his hunting them as they did beasts, within his toils. They represent Lethum as nearly related to Sleep; and Valerius Flaccus, in particular, acquaints us that they were brothers. Val. Flac. viii. ver. 74. Spence's Polymetis, p. 261. 263.

**LETI, GREGORY**, in *Biography*, was born at Milan in 1630. He received his education at the Jesuits' college at Cosenza, and afterwards passed some years in an unsettled ita'e, manifesting a strong repugnance to the ecclesiastical profession, which was propoled to him by his uncle the bishop of Aquapendente. Falling in company, at Genoa, with an officer of the Calvinistic persuasion, he became a convert to the reformed religion, and openly avowed it at Lausanne. He went to Geneva in 1660, married there, and settled as a man of letters. His talents were held in such estimation, that the right of citizenship was presented to him gratuitously; but his temper was so sarcastic, as to involve him in great troubles, and in 1680 he retired to England. Here he was favourably received; a pension was granted him, and he was promised the office of historiographer; but before he obtained it, he was ordered to quit the kingdom on account of some freedom which he had exercised in a work entitled "Teatro Britannico." He went to Amsterdam, became acquainted with the celebrated Le Clerc, who married his daughter, and obtained the title of historiographer of that city. Leti was a most industrious writer; his works are said to amount to a hundred volumes. Most of them are historical, but they are frequently destitute of truth, and cannot be relied on unless supported by other authority than the dictum of the writer. All his works are written in Italian, in a lively style, but diffuse and void of taste. His best productions are the lives of Sixtus V.; Charles V.; queen Elizabeth; Philip II.; and Cromwell. He died suddenly in the year 1701.

**LETI**, in *Geography*, a small island in the East Indian

sea, near the island of Timor. N. lat. 8 28'. E. long. 127° 15'.

**LE FLING**, a town of Brandenburg, in the New Mark; five miles E. of Cultrin.

**LETNA**, a river of Russia, which runs into the Viatka, at Podreskoi.

**LETSCHKOM**, or **ODISCH**, a town of Asiatic Turkey, and capital of Mingrelia; the residence of the chief and see of a Greek archbishop; 60 miles N. of Cotatis.

**LETTER**, or **LETTERBACH**, a town of Bavaria; 11 miles N. of Bamberg.

**LETTER, LITERA**, a character either in print or writing, by which any people have agreed to express one of the sounds, used in conveying their thoughts to each other in speech.

Letter is by some defined a simple uncompounded sound of the voice, that cannot be subdivided into any more simple, and generally marked with a particular character.

But it must be owned that, strictly speaking, a letter is not the sound itself, but rather the sign of a sound; for γράμμα, *litera*, is derived from γράμμαται, of γράφω, *to write*; and *litera* is formed from *litus*, the participle of *linere*, *to smear*, or *mark*; whence *oblitterare* signifies *to blot out*.

Where a sign or character does not express a sound entirely simple, but one resolvable into several, it is not so properly a letter as an abbreviation, containing in itself as many letters as its power does simple sounds. This is evident in the Latin  $\mathcal{C}$ ,  $x$ , and the Greek  $\xi$ ,  $\downarrow$ ,  $\tau$ , &c. which are composed of  $c$ ,  $l$ ,  $k$ ,  $s$ ,  $x$ ,  $s$ ,  $\sigma$ ,  $\tau$ , &c.

On the contrary, a simple sound, though expressed by several characters, is yet to be esteemed one letter; for *ib*, *ph*, are single letters; as much as  $\phi$ ,  $\theta$ , and *f*.

The letters, *f*, *g*, *b*, *k*, *q*, *x*, *y*,  $\omega$ , were unknown to the ancient Romans, as is proved by Daufquius in his Orthography, where he traces the origin of the several letters. See F, G, H, &c.

Grammarians distinguish letters into *vowels* and *consonants*; into *mutes*, *diphthongs*, *liquids*, and *characteristics*. See each of these terms respectively.

The Hebrews divide their letters into *guttural*, as *a*, *b*, *cb*, *gn*, *aleph*, *he*, *cheth*, *hain*, expressed by א, ב, ג, ד, ה, ו, ז, ח, ט, י, ק, ל, מ, נ, ס, ע, פ, צ, ק, ר, ש, ת; *dental*, as *z*, *s*, *tz*, *r*, *sh*, *zain*, *famech*, *tsade*, *resch*, *schin*, expressed by כ, פ, צ, ק, ר, ש, ת; *labial*, as *b*, *m*, *u*, *ph*, *beth*, *mem*, *vau*, *phe*, expressed by the word ב, פ, מ, ו, פה; *lingual*, or those chiefly formed by the tongue, as *d*, *t*, *l*, *n*, *th*, *daleth*, *teth*, *lamed*, *nun*, *thau*, expressed by ד, ת, ל, נ, ט, ז, טו, טז, טז; and *palatal*, as *g*, *i*, *c*, *k*, *ghimel*, *jod*, *cap*, *koph*, expressed by ג, י, כ, ק, פ.

Printers distinguish their letters into capital, majuscule, initial, or upper-case letters, which serve for the titles of books, proper names, &c.; and minuscule, small, or under-case letters; which are again divided, according to their size, into *pearl*, *nonpareil*, *picca*, *greatprimer*, *cannon*, &c.

They have also their flourished letters, engraven on wood or metal, which take place of the illumined letters of the ancient manuscripts.

There are letters of various sizes, or bodies; each of which, again, are sometimes cast with the Roman, sometimes an Italic, and sometimes an English, or Black letter face. There are also bodies with Greek, Hebrew, Arabic, the music face, &c.

Letters make the first parts or elements of grammar, constituting the subject of *orthography*; an assemblage of these composes *syllables*, of those *words*, and of these *sentences*. See each under their titles.

The alphabet of every language consists of a certain number of these letters, which ought to have a different sound, figure, and signification. See ALPHABET.

As the difference of articulate sounds was intended to express the different ideas of the mind, so one letter was originally intended to signify only one sound, and not, as at present, to express sometimes one sound, and sometimes another: which practice has brought a great deal of confusion into the languages, and rendered the learning of the modern tongues infinitely more difficult than it would otherwise have been. This consideration, together with the poverty of all the known alphabets, and their want of some letters to express certain sounds by, has occasioned several attempts towards an universal alphabet, to contain one enumeration of all such single sounds or letters as are used in any language. A thing of very considerable use; a specimen of which is given us by Mr. Lodwick, in the Philosophical Transactions. See *Universal CHARACTER*.

According to Crinitus, Moses invented the Hebrew letters; Abraham the Syriac and Chaldee; the Phœnicians those of Attica, brought into Greece by Cadmus, and thence by the Pelagians into Italy; Nicofrata the Latin; Isis the Egyptian: and Uphilas, about three hundred and seventy years after our Saviour, those of the Goths. Yet as to the first letters, what they were, who first invented them, and among what people they were first in use, there is still room to doubt; however, setting aside conjectures and prejudice, the business of antiquity seems to lie between the Egyptians and Chinese. Philo attributes the first invention of letters to Abraham; Josephus, St. Irenæus, and others, to Enoch; Babilander, to Adam; Eusebius, Clement Alexandrinus, Corn. Agrippa, &c. to Moses; Pomponius Mela, Herodian, Rufus Festus, Pliny, Lucan, &c. to the Phœnicians; St. Cyprian, to Saturn; Tacitus to the Egyptians; and some to the Ethiopians.

The Egyptian mummies and obelisks prove a great antiquity on the side of the hieroglyphics; but if the Chinese chronology may be credited, their characters are much more ancient than those of the Egyptians. The Chinese make Fohi, the first of their kings, supposed by many learned and judicious writers to have been no other than the patriarch Noah, the inventor of their letters, and compute him to have lived two thousand nine hundred and fifty years before Christ, during all which time they pretend to have certain and written accounts in their books. If this holds true, their character must be older than Moses by fourteen hundred years, and even prior to Menes, the first king of Egypt, by five hundred years; so that the Chinese letters appear to be the most ancient of that kind; and the book Yekim, said to be written by Fohi, the most ancient book.

But as China is so remote, and had so little communication with these parts of the world, we may reasonably make another enquiry into the original of letters in the hither parts of Asia, Egypt, and Europe. Here, indeed, the Egyptians seem to have the best title. It is more than probable, from the obelisks, &c. that their hieroglyphics were the first manner of writing, and the original characters in these parts, as being prior to Moses; and were made, at least in great measure, while the Israelites were slaves among them, and consequently not well qualified for inventions so very curious and judicious.

To this source the learned bishop Warburton ascribes the origin of alphabetical writing among the Egyptians: for as philosophy advanced, and their learned men wrote much, the exact delineation of hieroglyphic figures became too tedious and too voluminous; and they, therefore, by degrees

perfected another character, which he calls the running hand of hieroglyphics, resembling the Chinese characters, which being at first formed only by the outlines of each figure, became at length a kind of marks. See HIEROGLYPHICS.

This running character was denominated by the ancients *hieroglyphical*, and led to the compendious use of letters by an alphabet, which method of writing, as the ancients inform us, was invented by the secretary of an Egyptian king, and first used for secrecy in the conveyance of letters of state, whence it was called epistolary writing: but afterwards letters became common, and, as he observes, hieroglyphics secret and mysterious. This political alphabet, he adds, soon occasioned the invention of a sacred one, used by the priests, and called *hierogrammatical*. But the precise time of the invention of Egyptian letters cannot be so much as guessed at, because hieroglyphics continued in use long after letters had been found out: it is certain that they were very early, because the invention of them was ascribed to their gods. Bishop Warburton farther conjectures, that Moses brought letters with the rest of his learning from Egypt, and that he both enlarged the alphabet, because the Hebrew alphabet which he employed in the composition of the Pentateuch is considerably fuller than that which Cadmus brought into Greece; and altered the shapes of the letters, reducing them into something like those simple forms in which we now find them, in order to prevent the abuse to which they would be liable as hieroglyphic marks and symbolic images. He argues, that, considering the importance of letters among the Hebrews, with regard to the integrity of their religion, if God had been the immediate author of them, Moses would have recorded the history of their invention, as the best sanction to their use and best security from the danger of hieroglyphic writing, to which this people, so fond of Egyptian manners, were very powerfully inclined. Divine Legation, vol. ii. p. 1. 124, &c. See also on this subject Sharpe's Origin of Languages, p. 56, &c.

Many of the fathers, and some learned men among the moderns, have imagined that the knowledge of alphabetic writing was either supernaturally imparted to our first parents, or discovered very soon after the Creation by the efforts of their own powers. Others have supposed that alphabetical letters were introduced very early after the deluge, about the time of the dispersion of mankind, to which period the records of the Chaldean astronomy very nearly extend. Mr. Shuckford, who supposes that they were invented both in Assyria and Egypt, conjectures that the great project of Babel, next to the building of the tower, was the improvement of language, by dissolving the monosyllables, of which the first language of mankind consisted, into words of various lengths, in order to obtain new sets of names for new things; and that a project of this kind might gradually lead to the invention of alphabetical letters. Con. of Sacred and Prof. Hist. vol. 1. p. 248.

But to these conjectures it may be replied, that we have no authentic relation of any alphabetic character before the flood; the account of the inscription upon pillars by the first Mercury from Manetho, or of Seth mentioned by Josephus, being too fabulous to deserve credit. Besides, if they had been in use among the patriarchs after the deluge, many occasions occur, in which they would not have been omitted: and as we have no account of the use of alphabetic characters in epistles or contracts, or for other purposes to which they would naturally be applied, we may infer that they were not known. To which we may add, that none of the revelations of God to the patriarchs, were enjoined to be recorded till the giving of the law. Others have ascribed the invention of letters to the

Arabs,

Arabs, before the time of Moses; but when we consider the rudeness of their lives and manners, this opinion is by no means probable: and, therefore, the greater number of writers among Jews and Chirilians, both ancient and modern, have contented themselves with tracing their origin to Moses, supposed to be the same with the Egyptian Thoth or Hermes, mentioned in the history of that nation; alleging that God taught him the use of alphabetic letters, in the exemplar of the two tables, written, as the text assures us, with the finger of God; which words can be understood to mean only that they were written by a divine order and direction, as is evident by comparing Exod. xxiv. 27, 28. and ch. x. 4. It has been said by some of the advocates of this opinion, that the elements of language were thus supernaturally revealed to Moses upon the first arrival of the Israelites before Horeb, but that their characters, with the arrangement of them, might be left to his discretion. But it seems more probable, that letters were at this time well known to the Israelites, as God thought fit to deliver the first elements of their religion in that kind of writing: more especially as the history of so momentous a circumstance is not recorded; a circumstance, the memory of which would have been one of the greatest barriers against idolatry. From the Israelites, it is supposed this art of alphabetical writing passed to the Syrians, and from them it was communicated to the Phœnicians and Egyptians: though it seems probable that it was of a more ancient date among the latter than the time of the decalogue, or the delivery of the law on mount Sinai.

Sir Isaac Newton, in his Chronology, allows the Midianites, sprang from Abraham by his concubine Keturah, to have instructed Moses in the knowledge of writing.

Nevertheless, whether Cadmus and the Phœnicians learnt letters from the Egyptians, or from their nearer neighbours of Judea and Samaria, is a question; since some of the books of the Old Testament, being written in letters, is more likely to have given them the hint, than the hieroglyphics of Egypt. But when or wheresoever the Phœnicians learnt this art, it is generally agreed, that Cadmus, the son of Agenor, first brought letters to Greece; whence, in the following ages, they spread over the rest of Europe.

Herodotus, in his fifth book intitled Terpichore, informs us, that those Phœnicians who accompanied Cadmus into Greece, and settled there, among many other arts and sciences, introduced into that country the knowledge of letters, which the Greeks, in his opinion, were ignorant of till that time: their first letters were such as were in use among the Phœnicians; but some time after they altered them a little, both with regard to their make and sound; which alteration some have supposed to have been the change of the Hebrew characters into those that were afterwards called the Samaritan; and as at that time many of the neighbouring parts were inhabited by such as were originally Ionians, who also had received their letters from the Phœnicians, they mixed the one with the other; and hence those characters were termed Phœnician, because they were brought out of Phœnicia into Greece. Herodotus also adds, that he saw at Thebes, in Bœotia, in the temple of Imenian Apollo, three tripods, that had inscriptions upon them in Cadmean letters, which very much resembled the Ionic. The time of this expedition of Cadmus into Greece, is fixed by Sir Isaac Newton to about the 1045th year before Christ. The number of letters which Cadmus brought into Greece, according to Aristotle, as cited by Pliny, was eighteen; but according to Plutarch and Pliny himself, sixteen; to which Palamedes, in the time of the Trojan war, added four, and Simonides four; so that the Greek alphabet was gradually

perfected. The alterations and improvements introduced into Greece have led some writers to ascribe the invention of the alphabet to the Greeks; that, thus, Vossius de Arte Gram. lib. i. cap. 10. asserts, that Cecrops, who was much older than Cadmus, was the first author of the Greek letters; and others ascribe them to Lincus, or to Palamedes. (Diod. Sic. lib. iii. Tacitus, lib. xi. cap. 14.) But the more general opinion of the ancient writers is that they were derived from the Phœnicians and Egyptians. Diodorus (lib. v.) says expressly, that they were invented by the Syrians, and communicated by them to the Phœnicians, who changed the form of the characters brought into Europe by Cadmus. Pliny, (Nat. Hist. lib. vii. cap. 56.) says, that he is of opinion, that they were Assyrian, though he acknowledges that others thought they were invented by the Egyptians, and that Mercury was their first author. Diodorus, (lib. ii.) ascribes the invention of them to the same person; and likewise Plutarch Sympof. lib. xx. cap. 3. and Cicero de Natura Deorum, lib. iii. And the era of this invention is computed by chronologers to be as early as the year of the world 2054, and before the incarnation 1950 years. The Greeks retained the names and orders of several of the oriental or Cadmean letters, though they altered the form of them; and there are seven letters, viz. Γ, Δ, Η, Κ, Α, Ρ, Τ, whose original figures were retained by the Greeks with little variation. As to the Latins, all writers agree, that they received their letters from the Greeks, being first taught the use of them by some of the followers of Pelafgus, who came into Italy about 150 years after Cadmus came into Greece; or by the Arcadians, whom Evander led into these parts about 60 years after Pelafgus. Pliny (lib. vii. cap. 56.) and Solinus imagined the Pelafgi to have been the first authors of the Latin letters; but Tacitus (lib. xi. p. 131.) was of opinion, that the first Italians were taught letters by the Arcadians; and Dionysius Halicarnassus (lib. iii.) expressly affirms the same thing. That the Latin letters were derived from the Greek seems very probable from the similitude which the ancient letters of each nation bore to one another. Tacitus (Annal. lib. xi.) observes, that the shape of the Latin letters resembled that of the most ancient Greek ones; and the same observation was made by Pliny, lib. vii. cap. 58. and confirmed from an ancient table of brass inscribed to Minerva. Scaliger Digress. ad Annum Euseb. 1617, and Vossius, lib. i. cap. 24, 25. have adopted and supported the same opinions. See those citations in Shuckford's Conn. vol. i. p. 223, &c.

Thus we find, that Greece was the centre from which the rays of science shot into the western world; and the barbarous nations which penetrated into Italy towards the close of the Roman empire, carried arts and learning back into the North; or the knowledge of letters might be introduced among the northern nations from the borders of Asia, in an earlier age. (Sharpe's original Powers of Letters. Observations on Alphabetical Writing, 1772.) Rudbecks, who, in his Atlantica, claims the glory of all inventions, from all other nations, for the Swedes, maintains, that the Ionians had letters before Cadmus; that at the time of the siege of Troy, the Greeks had but sixteen letters, whereas the Phœnicians had twenty-two; whence he concludes, that it was not either Cadmus, or the Phœnicians, who taught this art to the Greeks. But, because the ancient northern nations had just sixteen letters, like the Greeks, he concludes the Greeks must either have taught them to the people of the North, or have learnt them of them. But because the form and make of the Runic letters is more artless and coarse than that of the Greek letters, he concludes, that these last must be derived from the former; taking

taking it as a principle, that those who derive any thing from another, polish and improve it. He even asserts, that by the golden apples, which Hercules was obliged to steal, meant be understood the letters in use among the Hyperboreans.

There are few things on which there has been so much written as on the original Hebrew letters. Origen, Eusebius Cæsariensis, St. Jerom, &c. have made it the subject of their enquiry. See HEBREW and SAMARITAN.

The art of joining letters to form words, and of combining the one and the other an infinite number of different ways, is a secret unknown to the Chinese. Instead of the alphabetical letters, they at first, like the Egyptians, used hieroglyphics; they painted, rather than wrote; striving, by the natural images of things drawn on paper, to express and communicate their ideas to one another.

To remedy the inconveniences of this method, they changed, by little and little, their manner of writing, making it more simple, though less natural. They even invented several characters, to express things that did not come within the reach of painting to represent: as voice, smell, thoughts, passions, and a thousand other objects that have no body or figure. From several simple strokes they afterwards framed others more compound; and in this manner multiplied the letters and characters to infinity, contriving one, or more, for every word.

This multitude of letters seems the source of that ignorance which we find among the Chinese; their whole lives being spent in learning their letters, they have no time to apply themselves to the study of things, but think themselves very learned when they are able to read. There are scarcely any of them that know all their letters; they think it is a great progress they have made, when, after forty or fifty years hard study, they are able to understand fifteen or twenty thousand. But the generality of their learned men come short of this. Father Le Compte is of opinion, that the greatest doctor among them never understood half of their letters well; for the whole number he reckons eighty thousand. This is a prodigious inconvenience to foreigners, of which the missionaries in that country make loud complaints.

Among the Chinese letters, there are some now almost worn out of use, and only preserved out of respect to antiquity. There is a second class, much less ancient than the former, only used in public inscriptions. A third, much more regular and beautiful, used in printing, and even in ordinary writing. However, as the strokes are to be distinctly formed, they cannot be written with any expedition. For this reason, they have invented a fourth kind, where the strokes, being closer, and less distant from each other, allow them to be written with more ease and readiness; and this they call the *running letter*. See CHINESE *Tongue*.

The Americans had no letters before the discovery of that country by the Spaniards. The Acaanbas engrave their memorable events and epochs on stones and metals; their songs supply the rest. In Peru and Chili, to keep an account of their goods and chattels, and to preserve the memory of their particular affairs, the Indians have recourse to certain knots of wool; which, by the variety of their colours and ties, serve instead of characters, and writing. The knowledge of these knots, which they call *quipos*, is one of their great sciences; but which is always kept as a secret, and never revealed to the children, till the fathers think themselves at the end of their days. See on the subject of this article LANGUAGE, GRAMMAR, and WRITING.

LETTERS, or *Literal Notation*, in *Music*. The Greeks

used all the twenty-four letters of their alphabet as musical characters; and these not sufficing for all their modes and genera in their natural state, were sometimes used as capitals, sometimes small; some entire, some mutilated; some doubled, and some inverted; to the amount of 1620 notes. See ALYSIUS, and NOTATION.

LETTER, *Domonical*. See DOMINICAL.

LETTER, *Double*. See DOUBLE.

LETTER, *Final*. See FINAL.

LETTER, *Cuttural*. See GUTTURAL.

LETTER, *Foundery*. See FOUNDERY.

LETTER, *Founders' Furnace*. See FURNACE.

LETTER, *Founders' Mould*. See MOULD.

LETTER, *Labial*. See LABIAL.

LETTERS, *Numeral*, are those used, instead of ciphers, to express numbers.

The Roman numerals are, C, D, I, L, M, V, X; which are all formed by describing a circle, and drawing two lines through it, crossing each other at right angles in the centre. See CHARACTER.

LETTER, *Nundinal*. See NUNDINAL.

LETTER is also a writing addressed and sent to one. See EPISTLE.

By 9 Geo. I. cap. 22. amended by 27 Geo. II. cap. 15. knowingly to send any letter without name, or with a fictitious name, demanding money, &c. or threatening, without any demand, to kill or fire the house of any person, is made felony without benefit of clergy. And by 30 Geo. II. cap. 24. persons sending letters with or without a name, or with a fictitious name, threatening to accuse any one of a crime punishable by law with death, transportation, pillory, or any other infamous punishment, in order to extort money or goods, shall be punished at the discretion of the court by fine and imprisonment, pillory, whipping, or transportation for seven years.

LETTERS of *abolition* were formerly granted by an abbot, to release any of his brethren from the obligation of subjection and obedience, and to make them capable of entering into any other religious order.

LETTER of *attorney*, in *Law*, a writing authorizing an attorney to do some legal act in our stead: as, to give seisin of lands, to receive debts, to sue a third person, &c. And letters of attorney are either general or special. West. Symb. par. 1. stat. 7 R. II. cap. 13.

The nature of this instrument is to give the attorney the full power and authority of the maker, to accomplish the act intended to be performed. Sometimes these writings are revocable, and sometimes not so; but when they are revocable, it is usually a bare authority only; and they are irrevocable, when debts, &c. are assigned to another; in which case the word irrevocable is inserted.

LETTERS *claus*, or *close*, are opposed to *letters patent*. See CLOSE ROLL.

LETTER of *credit*, among *Merchants*. See CREDIT.

LETTERS *communicatory*. See LITERÆ *communicatorie*.

LETTER of *exchange*. See BILL and EXCHANGE.

LETTER of *licence*, in *Trade*, an instrument or writing granted to a man who has failed, or broke, signed and sealed by his creditors; which letter usually gives a longer time for payment: so that the debtor, having such an assurance, may go about his business, without fearing an arrest.

LETTERS of *mart*, or *marque*, are letters under the privy seal, granted to the king's subjects; empowering them to take, by force of arms, what was formerly taken from them by the subjects of some other state, contrary to the law of mart. Letters of *marque*, in the British dominions, are to be

be granted by the admiralty; and they empower the commander of a merchant ship or privateer to cruise against and make prizes of the enemies ships and vessels, either at sea, or in their harbours. See *MARQUE*.

*LETTER missive*, in the *Election of a Bishop*. See *BISHOP*.

*LETTER missive*, in *Chancery*. If a peer is defendant in this court the lord chancellor sends a letter missive to him, to request his appearance, together with the copy of the bill; if he neglects to appear, then he may be served with a subpoena; if he continues still in contempt, a sequestration issues out immediately against his lands and goods, without any of the mesme procees of attachments, &c. which are directed only against the person, and therefore cannot affect a lord of parliament. The same procees issues against a member of the house of commons, except that the lord chancellor does not send him any letter missive.

*LETTERS patent*, or *overt*, are writings sealed with the great-seal of England, whereby a man is authorized to do or enjoy any thing, which of himself he could not do. They are so called, on account of their form; as being open with the seal affixed, ready to be shewn for the confirmation of the authority given by them; and usually directed or addressed by the king to all his subjects at large, thus, and in some other respects, differing from close letters. See *CLOSE ROLLS*.

Common persons may grant letters patent; but they are rather called patents, than letters patent; yet for distinction, those granted by the king, are sometimes called letters patent royal.

Letters patent conclude with *teste meisiso*; charters with *hinc testibus*. See *PATENT*.

*LETTERS of respite*, letters issued out by a prince, in favour of honest unfortunate debtors, against too rigorous creditors, whereby payment is delayed for a certain term.

The use of these letters is very ancient. Cassiodorus observes, they were in use in the time of Theodorick, king of the Goths; others will have them introduced towards the end of the eleventh century, by pope Urban II. in favour of those who went on the croisades.

They are still in use in France and some other countries, and take their name, à *respirando*, because they give the debtor a breathing time.

St. Louis granted three years respite to all who made the voyage of the Holy Land with him.

*LETTERS circular*, *dimissory*, *frank*, *monitory*, *pacific*, *papal*. See the several adjectives.

*LETTERS of safe-conduct*. See *SAFE-conduct*.

*LETTÈRE*, in *Geography*, a town of Naples, in Principato Citra, the see of a bishop, suffragan of Amali; 12 miles W.N.W. of Salerno. N. lat. 40° 43'. E. long. 14° 20'.

*LETTERED*, *LETRADOS*. See *LITERATI*.

*LETTERKENNY*, in *Geography*, a township of America, in Franklin county, Pennsylvania; containing 1497 inhabitants.

*LETTERKENNY*, a post-town of the county of Donegal, Ireland, situated on the river Swilly, over which it has a bridge. It is 113 miles N.W. from Dublin.

*LETTERN*, from *Letrinum*, the reading desk in ancient churches, &c., from which the epistles and gospels of the liturgy were read. The desks for the former frequently represented the prophet Moses with his horned countenance, those for the latter an eagle, the well-known emblem of St. John the Evangelist.

*LETTE*s, a people of Russia, derived from the Slavi and evincing a near affinity with the Vendi. Originally they were one people with the Lithuanians; as is evident from

the identity of their language and even of their names. In the middle ages the following denominations are used without distinction; *viz.* Letthnia, Letthovia, Lithavia, Liffonia, Lottavi, Litthvini, Letthovini, Letthvani, Lettoner, &c. Probably, says Tooke, the Lettes obtained their particular name from their first homelace. In the circle of Valk, not far from the town of Vendra, a river named Letta takes its rise; this river is called in Lettish "ta Lette," and a Lette is in their language Latvis, a man living by the river Lette. Till towards the end of the twelfth century Livonia or Lettland was entirely unknown to the German historians; it is mentioned only by Danes, Swedes, and Russians. By the two former on occasion of their piracies, and by the Russians for denoting their dominion over that country. Although Nestor, the oldest and most authentic Russian annalist, does not expressly mention the Lettes; this may possibly be owing to their not being at that time a particular nation distinct from the Lithuanians. It appears unquestionable from many testimonies, that the district inhabited by the Lettes on the Baltic already belonged to Russia in the earliest periods of its monarchy; it nevertheless appears that Livonia had then no settled constitution, nor was bound to the parent state by any firm political tie. (See *LIVONIA*) The homestead of the Lettes is not the whole of Livonia, but only a part of it which is called Lettland, consisting of four of the nine districts or circles into which Livonia, or the present vice-royalty of Riga, is divided; the remaining five circles being inhabited by Esthonians. Besides, the Kures in Courland, Semigallia, and the bishopric of Pilten are true Lettes; by whom, in part, the Lettish language is spoken in the greatest purity; and these people are mostly degenerated in Polish Livonia, where they are mixed with Poles and Russians. The number of them at present cannot be properly ascertained; but in the vice-royalty of Riga alone, there were upwards of 226,600 Lettes, according to the last census. At present they are no longer known as a separate people; they were mingled by imperceptible degrees, and at last blended with the Lettes, the Esthes, and the Coures, as they are usually called, the Lettonians, the Esthonians, and Courlanders. The Lettes, or Lettonians, are represented as a people always peaceable, industrious, hospitable, frugal, and of a somewhat better disposition than the Esthonians; and they inhabited the greater part of the Venden district, and extended themselves even into Dorpat, and hence it is that the chronicles mention the Lettes in Ungarnia. Their origin has been at one time sought for among the Grecian, and at other times among the Sarmatian tribes. By their language, however, it is perceived, that they bear an affinity with the Courlanders, or Coures, and that they are properly of Lithuanian, or in general of Slavonian origin. At present they occupy two districts, which both together are after them called Lettland. By the augmentation which they received from the Liefs, now reckoned with the Lettes, the Venders, the Lettgallians, and the Esthonians, they are more numerous than they were in the twelfth century. The Lettes call themselves Latwertis.

Both Esthonians and Lettonians, admitting many exceptions, are addicted to intemperance. Without beer and brandy they have no conception of pleasure. The aged in particular are hard drinkers, and continually smoke tobacco. They derive also a great part of their pleasure from singing and music. At their work in the field, as well as at their play, the girls are always singing. The most usual instrument with both nations is the bag-pipe, made by themselves, and sounded in proper time, in two keys, with great dexterity. The miserable horizontal harp, and the fiddle, which

which the Lettes are very fond of at all their festivals, were first introduced among them by the Germans. They are also very fond of dancing. Among their favourite summer pastimes is the swing; and this diversion, for which there is accommodation in every village at every house of entertainment, is in high vogue in Easter. In hot weather swimming is much practised by persons of all ages and sexes; and the boors without exception are passionately fond of scalding hot-baths. Infidelity towards their masters, distrust, a disposition to cheat and steal, and such like, are the vices to which they are addicted, and they certainly take their rise from the slavery in which they are held. They rarely rob one another; but they are very ingenious in devising means to impose upon their masters. Against them they have frequently risen in rebellion. Lying, cursing, and swearing are very current among them. Of their religion we shall only say, that when they were heathens, they were much given to superstition. Their paganism, it is said, was very similar to that of the Celts and ancient Germans. They had no temples, and acknowledged only one God, whom they adored under various names. They performed their religious rites in the open fields, on the top of a mountain, near a spring, or under the shade of a tree; and reckoned these places sacred. They believed in inferior deities, to whose care and government certain regions were allotted, and whom they much feared to offend. They had a god Thou, to whose influence they ascribed all aerial phenomena. Of the places and groves, where the ancient Lieflanders, as well as Eithonians as Lettonians, were accustomed to perform the holy rites of paganism, many, notwithstanding the strict orders that have been issued for their demolition, still remain, and they testify towards them an awful reverence. Offerings of wood, wax, yarn, bread, &c. are still in use among them, by laying them on the holy places, or cramming them in the hollows of aged trees. Springs and rivers likewise have their shares of these unbloody sacrifices. At their secret idolatrous assemblies, the keeping up of the fire, into which they throw all sorts of offerings, is still a principal observance. In Liefland they had idols, but no proper idol temples. The religious rites of the Celts and Lieflanders seem very much to resemble one another. Among both the Lettes and the Eithes many remains of heathenism are still observable; although in the twelfth century the Liefs, and afterwards the Lettes, were brought to the profession of Christianity by the Germans; and a part of the Eithes by the Danes. Tooke's View, &c. vol. 1.

**LETTING FARMS**, in *Rural Economy*, the practice of providing proper tenants for them, which is a business effected by different methods in different districts, as by private agreements, by proposals, and by public auction, to the highest bidder; all of which are liable to objections in some degree, but the first of these modes probably the least of any. See **FARM**.

**LETTONIA**, in *Geography*, a province of Russia, now included in the government of Riga. See **LETTES**, **LIVONIA**, and **RIGA**.

**LETTOWITZ**, a town of Moravia, in the circle of Brunn; 20 miles N.N.W. of Brunn.

**LETTUCE**, in *Botany and Gardening*. See **LACTUCA**.

**LETTUCE**, *Hart's*. See **SOW'S Thistle**.

**LETTUCE**, *Lamb*. See **VALERIANA**.

**LETTUCE**, *Will*. See **PRENANTHES**.

**LETTUCE**, in *Agriculture*, the name of a plant of the esculent kind, cultivated in the field in some districts for its use in feeding sows and pigs in the summer season. It is stated in the Calendar of Husbandry, that the writer first observed the sowing of lettuces for hogs practised in a pretty regu-

lar system, on the farm of a very intelligent cultivator (not at all a whimsical man) in Sussex. He had, every year, an acre or two which afforded a great quantity of very valuable food for his sows and pigs. He adds, that "it yields milk amply, and all sorts of swine are very fond of it." And he suggests, that "the economical farmer, who keeps many hogs, should take care to have a succession of crops for these animals, that his carts may not be for ever on the road for purchased grains, or his granary opened for corn oftener than is necessary." To raise this sort of crop, "the land should have been ploughed before the winter frosts, turning in by that earth 20 loads of rich dung per acre, and making the lands of the right breadth, to suit the drill-machine and horse-hoes, so that in this month (March) nothing more may be necessary than to fearily the land, and to drill the seed at one foot equi-distant, at the rate of four pounds of seed per acre. If half an acre or even a rood be tried near the farm-yard, the advantage, it is supposed, will not be inconsiderable."

Where the stock of swine is large, it may be proper to drill half an acre or an acre of lettuce in April, the land having been well manured and ploughed as directed above, being also scuffed in February and March, and well harrowed, repeating it before drilling. And at this period "the crop which was drilled in March (a succession being essentially necessary) should be thinned in the rows by hand, to about nine or ten inches asunder. If this necessary attention be neglected, the plants draw themselves up weak and poor, and will not recover it. Women do this business as well as men. When about six inches high, they should be horse-hoed with a scarifier or scuffler," having the hoe about four inches, or at most five inches, in width. With this sort of green food some kind of meal, or other dry meat, should be combined, as without it, it is apt to prove very laxative, and of course injurious to the animals. See **HOG** and **SWINE**.

**LEITZKAW**, in *Geography*, a town of Prussia, on the Vistula; 14 miles S.E. of Dantzic.

**LEITZNIG**, a town of the duchy of Holstein; six miles S.S.W. of Segeberg.

**LEVANDIS Millium Expensis**. See **EXPENSIS**.

**LEVANGHE**, in *Geography*, a small island near the E. coast of Ithria. N. lat. 45° 1'. E. long. 15° 52'.

**LEVANT** signifies any country situate to the east of us, or the eastern side of any continent or country, or that on which the sun rises.

**LEVANT**, or *Titus*, one of the Hæres islands, on the Mediterranean, near the coast of France. N. lat. 43° 4'. E. long. 6° 34'.

**LEVANT**, in *Matters of Commerce*, &c. is generally restrained to the Mediterranean seas; or, rather, to the country on the eastern part of it; or the coasts of Asia, and especially Asiatic Turkey, from Alexandria in Egypt to the Black Sea, including the islands of Cyprus, Rhodes, and the Archipelago.

Hence, our trade thither is called the *Levant trade*; and a wind that blows from thence, out of the Straits mouth, is called a *Levant wind*.

France was the first nation that made treaties of commerce with the Porte. The fleur de la Foret signed them in 1535; in the name of Francis I. and thereby obtained many privileges in favour of that kingdom; which they alone enjoyed, until the Venetians, the English, the Hollanders, and at length the Genoese, likewise obtained particular privileges for themselves.

**LEVANT Measures**. See **MEASURE**.

**LEVANT**, *Bale of the*. See **BOLE**.

LEVANT and *Coubant*, in *Law*, is, when cattle have been so long in another man's ground, that they have lain down, and risen again to feed, which, in general, is held to be one night at least. See DISTRESS.

LEVANTINE VALLEY, or *Valle Leventina*, in *Geography*, a valley of Helvetia, subject to the canton of Uri, and situated S. of St. Gothard, watered by the Tesino, and inhabited chiefly by Italians. It is supposed to retain by its name, traces of the "Leponiti," the ancient inhabitants of the surrounding regions. Its length, from the summit of the passage on the St. Gothard, is about eight leagues; the breadth is very inconsiderable. The lower part is extremely populous, rich in pasturage, and produces much hemp and flax. In the vicinity of the lofty mountains adjacent to it, the climate is various, and the country subject to much rain. To prevent the rain from damaging the crops, the inhabitants suspend and dry the corn and grass, on bars supported by two high poles about 15 feet asunder. The houses are entirely of wood, and externally appear like Swiss cottages; but a neglect of cleanliness proves the vicinity and greater similarity to the Italians. The Tesino is here joined by the Bromio, a torrent which takes its rise in mount Uccello, or the Vogelfberg, near Splagen; a bridge over it is the boundary of the two bailiwages of the vallies Levantine and Polese, and leads into that of Riviere. The valley now becomes perfectly flat, and of course subject to violent inundations; the few villages are scattered on the sides of the steep mountains; all below is desolate. Offogne, the residence of the bailiff, consists only of a few houses.

LEVANTO, a town of the Ligurian republic, on the coast of the Mediterranean; eight miles W. of Spezza.

LEVANZO, a small island in the Mediterranean, near the W. coast of Sicily; about nine miles W. of Trapani. N. lat. 38° 5'. E. long. 12° 24'.

LEVARE, ANTI-PHONON, in the *Musæ* of the *Romish Church*, is to begin or open the first note of an anthem.

LEVARI FACIAS, in *Law*, a writ directed to the sheriff for levying a sum of money on a man's lands and tenements, who has forfeited his recognizance; in virtue of which the sheriff may seize all his goods, and receive the rents and profits of the lands, till satisfaction be made to the plaintiff; but this writ has now given way to the remedy by *elegit*. There is also a *levari facias damna disseisitoribus*, for the levying of damages, wherein the disseisor has been formerly condemned to the disseise; and also a *levari facias residuum debiti*, to levy the remainder of a debt upon lands and tenements, or chattels of the debtor, where part has been satisfied before. And farther, a *levari facias quando vicecomes returnavit quod non habuit enforceos*, commanding the sheriff to sell the goods of the debtor which he has taken, and returned that he could not sell.

LEVARLOW, in *Geography*, a town of Poland, in the palatinate of Lublin; 40 miles S.S.W. of Lublin.

LEVASCHEVA, a town of Russia, in the government of Olonetz, on the W. coast of the lake Latcha; 16 miles S.S.W. of Kargapol.

LEVATIO ARIETUM. See ARIETUM.

LEVATOR, in *Anatomy*, a name given to various muscles, which have the effect of drawing parts upwards, or elongating them.

LEVATOR ani, is a muscle connected with the inferior extremity of the intestinal canal. See INTESTINE.

LEVATOR anguli oris, is a muscle of the lips, described under DEGLUTITION.

LEVATOR communis labiorum, is the same with the levator anguli oris.

LEVATORES cælarum, are the commencements of the external frons of intercollicular muscles. See INTERCOSTAL.

LEVATOR labii superioris et alæ nasi, a muscle common to the upper lip and the wing of the nose. See DEGLUTITION.

LEVATOR labii superioris proprius, is a portion of the former, sometimes described as a distinct muscle.

LEVATOR labii inferioris, is the same with the levator menti.

LEVATOR menti, is a small muscle situated in the chin, and described with the muscles of the lips in the article DEGLUTITION.

LEVATOR oculi, a name sometimes given to the superior straight muscle of the eye. See EYE.

LEVATOR palati molliis, a muscle of the soft palate described in the article DEGLUTITION.

LEVATOR palpebræ superioris, a muscle of the orbit belonging to the upper eye-lid. See EYE.

LEVATOR scapulae, a muscle of the scapula, called also angularis, and, by Dumas, trachelo-scapulien. It is situated in the upper part of the back, and on the lateral and posterior part of the neck; it extends from the superior angle of the scapula to the transverse processes of the four first cervical vertebrae. It is elongated, flattened, and broader below than above. Its external surface is covered below by the trapezius, above by the sternocleidomastoideus, and in the middle by the skin. The internal surface covers the serratus superior pollicis, the sacro-lumbalis, the transversalis colli, and the splenius. The edges present nothing remarkable; the posterior is longer than the anterior, and covers a part of the upper edge of the rhomboideus.

The inferior extremity is attached to the superior angle of the scapula, to the upper part of its basis, and to the internal portion of its upper edge. From this point the muscle passes upwards and forwards; it grows narrower, and is soon divided into four portions, which are at first united together by cellular tissue, but afterwards separate to be attached to the points of the transverse processes of the four first cervical vertebrae. These portions are often connected to the splenius and scalenus posterior. Sometimes the levator scapulae has only three portions fixed to the three first vertebrae of the neck; that which is attached to the atlas is larger and longer than the others, which diminish successively in size and length downwards.

It is tendinous at its attachments, and fleshy in other parts. The posterior fibres are longer than the anterior; a fasciculus of fibres is sometimes added to its front edge from the first rib.

The name of this muscle has led to a notion that it elevates the shoulder; and it has been called *musculus patientie*, from the supposition, that it acted in shrugging the shoulders. In truth it rather depresses than elevates this part; it draws the superior angle of the scapula upwards and forwards, but then the bone is rotated in such a way that its anterior angle, forming the shoulder joint, is depressed. It is assisted by the pectoralis minor. If the trapezius act in conjunction with it, the shoulder will be elevated. Supporting the shoulder to be fixed, it will incline the head and neck backwards, and towards its own side.

LEVATUM. See TERRIS & *Catalis tennis ultra debitum*.

LEUBITZ, in *Geography*, a town of Hungary; eight miles S. of Podolicz.

LEUBUS, a town of Silesia, in the principality of Wohlén, on the Oder, near which is a celebrated Cistercian

abbey, founded at the commencement of the 11th century; nine miles S.W. of Wohlen.

**LEUCA**, in *Ancient Geography*, a small town of Italy, in the country of the Salernini, and in the vicinity of the Japygian promontory. Strabo.—Also, a town of Asia Minor, on the confines of Ionia and Æolia. Pomponius Mela places it near Phocæa, in the gulf of Smyrna; and Pliny places it near Phucæa, on a promontory which was formerly an island. Diodorus Siculus says, that Leuca was situated between Cumæ and Clazomene.

**LEUCACANTHA**, in *Botany*, a name used by Dioscorides, and the other Greek writers, for the *acacia* tree, which produces the gum arabic, but it was also used for a kind of prickly plant, called also *angaila* by some of the Arabians; as being a plant whose roots were knotted and jointed. These joints were separated and dried, and then used in medicine as cardiacs and carminatives, under the names of *hank* or *hunken*. They were of a very agreeable aromatic smell, and very little taste; and the ancients always preferred such of them as were yellow and light, rejecting those which were heavy and white, and which wanted smell. It is not well known at this time what these roots were; but it is necessary, in order to the right understanding the works of the ancients, to know that there were such roots; and that though called by the same name with the gum arabic tree, they were of a very different nature.

**LEUCACHATES**, in the *Natural History of the Ancients*, the name of an agate, not a peculiar species, but only a particular appearance of the lead-coloured agate, called *phallobates*.

**LEUCADENDRON**, in *Botany*, from λευκός, *white*, and δένδρον, *a tree*, expressive of the hoary or silvery whiteness for which the fruit and smell of the species is remarkable. The name seems to have originated with Hermann, who communicated to Plukenet the Silver-tree of the Cape, under the appellation of *Leucadendros Africana*, for which Linnæus, in his *Classes Plantarum*, adopted it; but afterwards, in his *Genera*, applied this name to another tribe of the same order, and subsequently sunk both in *Protea*. Mr. Brown has restored the original *Leucadendron*. Silver-tree. Brown Tr. of Linn. Soc. v. 10. 50. (Conocarpo-dendra; Boerh. Lugd.-Bat. ed. 2. t. 175. 197. 200. 202—4.)—Class and order, *Dioecia Tetrandria*. Nat. Ord. *Aggregata*, Linn. *Protea*, Juss. *Proteaceæ*, Brown.

Gen. Ch. Male. Cal. Common Perianth imbricated, of numerous, unequal, single-flowered scales. Cor. Petals four, equal, linear, cohering in their lower part, revolute at their extremities, downy externally. Stam. Filaments four, short, inserted into the petals; anthers linear, of two cells, bursting lengthwise. Pist. imperfect, or none.

Female. Cal. like the male; its scales permanent, dilated and hardened. Cor. like the male; bearing abortive stamens. Pist. Germen superior, sessile; style simple, straight, rigid, terminal; stigma oblique, club-shaped, emarginate, rather hispid. Peric. none, except the permanent woody calyx, whose scales are sometimes confluent. Nut solitary, concealed by the scales of one seed.

Eff. Ch. Male. Calyx imbricated; its scales single-flowered. Petals four, bearing the stamens.

Female. Calyx imbricated, permanent. Petals four. Stigma oblique, club-shaped, emarginate, rather hispid. Nut of one seed, concealed by the hardened scales of the calyx.

Thirty-eight species of this noble genus are defined by Mr. Brown, all natives of southern Africa, near the Cape of Good Hope, where they usually grow in moist stony or

fandy places, about rivers, and, as far as we know, in no other part of the world. A few of them have long been cultivated in the greenhouses of Europe, but the greater part are only known in the herbariums of the curious. One of the finest collections of this whole natural order was procured from the Cape by Mr. Niven, for his patron G. Hibbert, esq. to whose liberality we are indebted for specimens of the whole.

The habit of *Leucadendron* is arborescent or shrubby, but sometimes tortuous and depressed. Leaves flat, linear, lanceolate, or obovate. Heads of flowers often yellow, not large, but frequently accompanied by very large, spreading, dilated, pilulif bractæas, which are highly ornamental.—Examples are

*L. argenteum*. (*Protea argentea*; Linn. Sp. Pl. 1. 37. Gærtn. t. 51. Lamarec Illustr. t. 53. f. 1. Conocarpo-dendron; Boerh. t. 195. Argyrodendros africana, foliis fericis et argenteis; Commel. Hort. v. 2. 51. t. 26.)—Arborescent. Leaves lanceolate, silvery; their edges, as well as the branches, hairy. Inner bractæas shorter, downy. Corolla of the male silky.—This splendid tree, growing about the bases and sides of mountains at the Cape, soon attracted the notice of the first European visitors, and was brought into the Dutch gardens, from whence probably it came to England early in king William's reign. The flowers are not ornamental, nor are they scarcely ever seen here, but the silvery splendour of the leaves is unrivalled; they are three or four inches long, sessile, lanceolate, acute, entire, spreading in every direction, clothing the branches in great abundance. Flowers solitary, terminal.—The whole style is permanent in this and four other species only.

*L. Levifanus*. Brown n. 9. Berg. Cap. 20. (*Brunia Levifanus*; Linn. Sp. Pl. 28. B. foliis oblongis incanis, &c.; Burm. Afric. 267. t. 100. f. 2, male plant. *Protea Levifanus*; Willd. Sp. Pl. v. 1. 526.)—Leaves obovate or spatulate, very blunt; smooth when full grown. Branches hairy. Heads of male flowers sessile. Seeds pointless, invelted with long hairs.—Grows in sandy heathy plains near the Cape. The stem is abruptly branched. Leaves numerous, upright, about half an inch long, entire. Flowers in little round yellow heads, without any prominent bractæas.

*L. corymbosum*. Berg. Cap. 21, male plant. (*Protea corymbosa*; Thunb. Diss. de Proteâ, n. 28. t. 2, male plant. Andr. Repof. t. 495, female.)—Leaves linear-awl-shaped, imbricated, smooth. Scales when in fruit acute, recurved at the points. Seeds somewhat compressed, inversely heart-shaped, hairy at the edge. Found at several places near the Cape. Much akin to the last in its flowers, but the leaves are totally different, resembling the narrow foliage of an *Erica* or *Diosma*. The young branches are purplish, whence it used to be called by gardeners, before it blossomed, *Protea purpurea*. Mr. Brown observes that each sex has four glands, or nectaries, at the base of the germen, which our last-described wants.

*L. concolor*. Brown n. 15. (*Protea globosa*; Andr. Repof. t. 307. Suns in Curt. Mag. t. 878, both male plants. P. itrobilina; Schrad. Sert. Hannov. t. 1, female.)—Leaves spatulate-oblong, with a callous point; smooth when full grown; the floral ones of the same colour. Branches downy. Scales of the fruit obtuse, fringed; woolly at the base.—Found near the Cape. Said to have been first raised in England by Messrs. Lee and Kennedy. This belongs to a handsome tribe of species, whose large heads of yellow flowers are encompassed by large spreading floral leaves or bractæas, which in most are coloured, but in this agree in hue with the foliage, and like that are about

two inches long, and nearly one broad, with red callous tips.

*L. grandiflorum*. Brown n. 16. (*Eurypernum grandiflorum*; Salisf. Parad. t. 105.)—Leaves obovate-oblong, with a callous point; smooth when full grown; the floral ones coloured. Branches very minutely downy. Scales of both sexes ovate, bluish, smooth, coloured.—Gathered on mount Wynberg at the Cape, by Mr. Niven, who sent it to Mr. Hbbert. It is larger and handsomer than the last, having splendid whitish *bractææ*, resembling the petals of some fine polyanthus flower.

*L. stridum*. Brown n. 21. (*Eurypernum falcifolium*; Salisf. Parad. t. 75. *Protea conifera*; Andr. Repof. t. 541.)—Leaves smooth, linear, with an awl-shaped point. *Bractææ* ovate, acute, coloured, longer than the flowers. Scales of the fruit dilated, rounded, smooth. Seeds without wings, dotted.—Native of moist stony places, about rivers, at the Cape, according to Dr. Roxburgh. Mr. Niven seems to have introduced this pretty species to our gardens, which is distinguished by its narrow leaves, copious and ornamental, though small, flowers, whose *bractææ* are white and pointed.—This species is nearly allied to *Protea pallens* and *conifera* of Linnæus and other authors, the former of which appears to be the male, and the latter the female, of Mr. Brown's *L. adfendens*.

*L. abietinum*. Brown n. 31. (*Protea tetrefifolia*; Andr. Repof. t. 461.)—Leaves all thread-shaped, channelled, bluish, smooth, spreading, curved slightly upwards. Scales of the fruit united by their lower part; distinct and two-lobed above.—Frequent about the Cape. A humble *Strub*, with numerous spreading fir-like green leaves, the uppermost of which, unchanged, encompasses the little yellow heads of female flowers, instead of *bractææ*. The heads of male flowers are smaller, and more elevated.

**LEUCADIA, ST. MAURE**, in *Ancient Geography*, an island, or rather a peninsula which was attached to Epirus by a straight isthmus, about 100 paces long and 600 broad. Upon it was situated the town of Leucas, on the summit of a mountain towards the N.E. Homer places here three towns, viz. Neriton, Croeyla, and Agylia. On the site of the first of these towns the Corinthians built that already mentioned; Leucas is now an island, the isthmus having been separated from the continent. Thus Ovid describes it:

“Leucada continuam veteres habuere coloni  
Nunc freta circumant.”

It was a tradition that unfortunate lovers made choice of this promontory for precipitating themselves into the sea. On this promontory Apollo had a temple. See **ST. MAURE**.

**LEUCANTHEMUM**, in *Botany*, from *λευκον*, white, and *ανθος*, a flower, has been the appellation of several plants of the compound radiated kind, whose rays are white; and now remains as the specific name of the common English *Chrysanthemum leucanthemum*, Great Ox-eye, or Moon Daisy.

**LEUCARUM**, in *Ancient Geography, a place of Great Britain, on the route from Caleva to Uococonium, according to the Itinerary of Antonine. It is supposed to be the same with the Leacomagus of the anonymous of Ravenna. It lies between Scadum Nunniorum and Bomiun, and is supposed to be near Gatenbury. Camden, Gale, and Baxter, imagine that Leucarum was situated where the village of Locharnum or Lochorlands, on the bank of the river Locher in Glamorganshire. But this seems to be at much too great a distance from the other stations of Cluseborough and Axbridge.*

**LEUCAS**, in *Botany, so named by Burmann and Brown,*

in allusion to the downy whiteness of its flowers, *λευκος*; being an ancient Greek name for some herb, now unknown to us, so called on account of its whiteness. *Burm. Zeyl.* 140. *Brown. Prodr. Nov. Holl. v. 1. 504.* *Ait. Hort. Kew. ed. 2. v. 3. 409.*—Class and order, *Didymia (Cymnosperma. Nat. Ord. Verticillate, Linn. Labiate, Juss. Brown.*

**Gen. Ch.** *Cal.* Perianth inferior, of one leaf, tubular, oblong, with ten ribs; permanent; its orifice unequally toothed, with from six to ten teeth. *Cor.* of one petal, ringent; tube cylindrical; upper lip vaulted, bearded, undivided; lower longer, in three segments, the middle one largest, often notched. *Stam.* Filaments four, concealed by the upper lip, two of them longer than the rest, anthers of two oblong divaricated lobes. *Pist.* Germen superior, four-cleft; style the length and position of the filaments; stigma eleven, acute, its upper segment shortest. *Peric.* none, except the permanent calyx. *Seed.* four, oblong, triangular.

**Ed. Ch.** Calyx wh ten ribs; unequally toothed. Upper lip of the corolla bearded, undivided; lower longer, three-cleft; the middle segment largest. Lobes of the anthers divaricated. Upper segment of the stigma shortest.

1. *L. zeylanica*. Ceylon Leucas. (*Phlomis zeylanica*; Linn. Sp. Pl. 820. Jacq. Ic. Rar. t. 111? *Herba ad irationis*; Rumph. Amboin. v. 6. 39. t. 16. f. 1.)—Leaves lanceolate, slightly serrated. Whorls nearly terminal. *Bractææ* fringed. Calyx oblique, with ten nearly equal teeth.—Native of the island of Mauritius; as well as of Java, and other parts of the East Indies. The root is annual. *Stem* square, downy, leafy, about a foot high, branched from the bottom in a corymbose bushy manner. *Leaves* opposite, about an inch and half long, scarcely half an inch broad, lanceolate, bluish, finely downy, veiny, wavy, or bluntly serrated, tapering at the base into a short footstalk. *Whorls* dense, axillary, one or two at the top of each stem or branch, furnished by leaves, and accompanied by several linear-lanceolate, acute, downy, strongly fringed *bractææ*. Calyx downy, swelling upwards; its orifice oblique, fringed with ten, nearly equal, small spinous teeth. *Corolla* twice as long as the calyx, white, hairy externally, especially the upper lip.

2. *L. lavenderifolia*. Lavender-leaved Leucas. (*Leonurus indicus*; Linn. Sp. Pl. 817. *Phlomis zeylanica* 2; Syst. Veg. ed. 13. 450. Willd. Sp. Pl. v. 3. 123.)—Leaves linear-lanceolate, nearly entire. *Bractææ* linear, downy. Calyx oblique, with seven teeth; the uppermost largest.—Native of the East Indies. Linnæus had it from Burmann. He first described it as a *Leonurus*, but afterwards corrected it with his *Phlomis zeylanica*, of which last he had but a very imperfect specimen. The present is distinguished by its much longer, and nearly, if not quite, entire leaves; the whorls are more numerous; *bractææ* more linear, downy, but not fringed; and the calyx is essentially different, having but seven, and those very unequal, teeth. *Corolla* much like the last. It is hard to say whether Jacquin's and Rumphius's synonyms belong to this or the *zeylanica*, for they neither of them teach any thing essential, but Jacquin's leaves certainly most resemble the present. The three figures of Plukenet, cited doubtfully by Linnæus, do not well accord with either.

3. *L. martinicensis*. West Indian Leucas. (*Phlomis martinicensis*; Swartz. Prodr. 88. Willd. Sp. Pl. v. 3. 123. *Ph. caribæa*; Jacq. Ic. Rar. t. 110. Swartz. Ind. Occ. v. 2. 1009.)—Leaves ovate-oblong, serrated, downy. *Bractææ* brittle-shaped, fringed. Whorls globose. Calyx incurved, with ten teeth; the uppermost longest.—Native of Brazil.

and the West Indies, from whence Mr. Masson sent seeds to Kew in 1781. *Root* annual. *Stem* branched, two or three feet high. *Leaves* stalked, an inch and half long, oblong, more or less ovate, hairy above, more downy and paler beneath, bluntish, strongly ferrated; entire and tapering at their base. *Whorls* numerous, axillary, dense, many-flowered, and nearly globose, with narrow, strongly fringed or bristly *bracteas*. *Calyx* curved forward, downy, with strong green ribs and white reticulated spaces between; its orifice bordered with ten spinous, all rather unequal, teeth, of which the upper one is twice or thrice as long as the rest. *Corolla* small, white, brown in decay.

4. *L. urticifolia*. Nettle-leaved Leucas. (Phlomis urticifolia; Vahl. Symb. v. 3. 76. Willd.)—"Leaves ovate, ferrated, hoary. *Bracteas* awl-shaped. *Calyx* obliquely truncate, membranous, with nine teeth."—Native of Arabia Felix, and the East Indies.—"*Root* annual. The plant resembles *Ph. indica* of Linnaeus (our *Leucas indica*), but the *stem*, as well as *leaves*, are not downy, but hoary with extremely minute hairs. The *leaves* are of the same colour on both sides, deeply ferrated, flat not rugged, downy underneath. *Calyx* rather small."—We know this merely from the above authority.

5. *L. indica*. East Indian Leucas. (Phlomis indica; Linn. Sp. Pl. 820.)—"Leaves ovate, ferrated, very downy beneath. *Bracteas* linear, hairy. *Whorls* globose. *Calyx* oblique, with one three-toothed lip."—Native of the East Indies. The seeds were sent to England by M. Thouin in 1789. *Root* annual. *Leaves* stalked, ovate, two inches long and one broad, ferrated, downy above, but whiter and softer beneath. *Corolla* very hairy. *Calyx* much enlarged and elongated after flowering, its forepart extended into an upright, oblong, ribbed and reticulated lip, with three spinous teeth at the extremity; the opposite or upper side of the orifice being short, with three or four very minute teeth.

6. *L. decemdentata*. Ten-toothed Leucas. (Stachys decemdentata; Fort. Prodr. 91. Phlomis decemdentata; Willd. Sp. Pl. v. 3. 124.)—"Leaves oblong, ferrated; contracted at the base. *Whorls* without *bracteas*. *Calyx* with ten teeth."—Native of the Society Islands. "*Stem* herbaceous, downy. *Leaves* stalked, an inch long, rather acute, ferrated, downy. *Whorls* somewhat stalked, destitute of *bracteas*. *Calyx* bell-shaped, with ten furrows, and ten awl-shaped teeth, alternately smaller. Tube of the *corolla* rather longer than the *calyx*; upper lip erect, undivided, very hairy; lower smooth, in three deep segments." Willdenow.

7. *L. biflora*. Two-flowered Leucas. (*L. foliis rotundis ferratis, flore albo*; Burm. Zeyl. 140. t. 62. f. 1. *Phlomis biflora*; Vahl. Symb. v. 3. 77. Willd. Sp. Pl. v. 3. 124.)—"Leaves ovate, ferrated. Flowers axillary, solitary, opposite. *Calyx* with ten regular teeth."—Native of the East Indies. A slender downy or rather hairy plant, with the habit of a *Stachys* or *Sideritis*. *Leaves* about half an inch long, stalked, ovate, bluntish, with five or six serratures at each side. *Flowers* nearly sessile, without *bracteas*. *Calyx* funnel-shaped, hairy, strongly ribbed, with ten sharp taper teeth, of which the five intermediate ones are rather shorter than the others. *Corolla* twice the length of the *calyx*, white, downy.

8. *L. chinensis*. Chinese Leucas. (Phlomis chinensis; Retz. Obs. fac. 2. 19. Willd. Sp. Pl. v. 3. 125.)—"Leaves ovate, ferrated, clothed with silky down. Flowers whorled, stalked. *Calyx* with ten teeth."—Native of China. "*The stem* is shrubby, with square hispid branches. *Leaves* opposite, ovate and somewhat heart-shaped, stalked, fer-

rated, clothed with silky down. *Whorls* axillary, of five or six flowers, on stalks. *Calyx* funnel-shaped, with ten furrows and ten awned teeth. *Corolla* white, its upper lip compressed, hairy externally, especially the margin; lower three-lobed, nearly naked."—Retzius.—It is to be presumed the *calyx*-teeth are regular, probably five rather the shortest as in the last. We have never seen this species, and it stands here on Mr. Brown's authority. Retzius's account of the compressed upper lip should, however, make it a *Phlomis*.

9. *L. moluccoides*. Wing-flowered Leucas. (Phlomis moluccoides; Vahl. Symb. v. 1. 42. t. 14. Willd. Sp. Pl. v. 3. 125. Clinopodium fruticosum; Forst. Egypt.-Arab. 107.)—"Leaves ovate, ferrated, finely downy. Flowers whorled, stalked. *Bracteas* linear-lanceolate. Lower segment of the *calyx* dilated, rounded, membranous, ribbed, obscurely toothed.—Gathered by Forkall in Arabia, on the hills of Hadie. One of his specimens in ripe seed, and Vahl's figure in flower, fully authorize us in referring this plant also to *Leucas*, though Mr. Brown has not mentioned it. The *stem* is shrubby, five or six feet high, with roundish downy branches. *Leaves* stalked, strongly ferrated; rough and punctate above; paler and very downy beneath; an inch or more in length. *Whorls* many-flowered, stalked, with downy *bracteas*, cut into many deep, linear, or somewhat lanceolate, segments. *Flowers* white, the size of *Laminium album*, hairy, their lower lip, according to Forkall, convex, three-lobed, the middle lobe broad, long, and heart-shaped, which agrees with the generic character, but is not properly represented in Vahl's plate, though indicated in his description. The *calyx* is very peculiar, and really two-lipped; the upper lip small, ovate and acute; the lower very large, especially when in seed, spreading, rounded, scarious, with seven or eight hairy ribs, and numerous reticulated veins; the margin wavy, or slightly toothed, not awned nor spinous; the tube is hairy, and has ten strong ribs. We can see nothing of the lateral lobes mentioned by Vahl, and indeed he seems, in his description and figure, to have been bewildered between the lower lip of the *calyx* and that of the *corolla*.

10. *L. glabrata*. Smooth Leucas. (Phlomis glabrata; Vahl. Symb. v. 1. 42. Willd. Sp. Pl. v. 3. 126.)—"Leaves ovate, ferrated, slightly hairy. Flowers whorled. *Bracteas* minute, bristle-shaped, smooth. Lower segment of the *calyx* elongated, three-toothed. Hairs of the stem deflexed.—Gathered in Arabia by Forkall, amongst whose plants it was found without a name. Vahl describes it as "herbaceous, the *stem* acutely angular, its angles and joints rough with reverted hairs. *Leaves* stalked, spreading, ovate, bluntly ferrated, entire at the base, acute, slightly hairy, about an inch long. *Whorls* remote, of six or eight flowers. *Bracteas* minute, in four deep, bristle-shaped, rather pungent, smooth segments, yellowish at the extremity, but one-fourth so long as the *calyx*; which is bell-shaped, smooth, with ten furrows, its orifice oblique, the lower lip being elongated, with three equal bristle-shaped teeth, the upper with seven teeth. *Corolla* like the last."

11. *L. flaccida*. Flaccid Leucas. Brown. Prodr. Nov. Holl. v. 1. 505.—"Leaves ovate, membranous, nearly smooth, as well as the *calyx*, which has ten equal teeth. *Whorls* many-flowered."—Gathered by sir Joseph Banks in the Tropical part of New Holland.

It will readily be perceived that the great diversity and irregularity of shape in the *calyx* of the different species, directly militate against the Linnaean division of *Didynamia Angiospermia*, into genera whose *calyx* is more or less exactly five-cleft, and others in which it is two-lipped; but

*Leucas* is not on that account the less natural a genus, and this very irregularity is its striking character. How far it might be possible or eligible to separate from it the species with a strictly regular calyx, may be worthy of future consideration. Mean while it had best stand in the first of the above sections, as not being regularly or properly two-lipped, as well as on account of its affinities.—*Phlomis alba*, Vahl. Symb. v. 1. 43, should seem also to belong to *Leucas*, though the calyx has but five teeth, but we have never had an opportunity of examining it.

*LEUCAS Delphinus*. See DELPHINUS.

*LEUCASIA*, in *Ancient Geography*, an island of the Tyrrhenian sea, upon the western coast of Italy, in the gulf of Paestum, according to Strabo and Mela.

*LEUCASPIS*, a port of Africa, in the gulf of Libya. Ptolemy.

*LEUCATA*, a promontory of Gaul, in the Mediterranean; now called "Cap de la Franqui."

*LEUCATE*, or *LEUCATAS*, a promontory of Asia, in Bithynia, and one of those which formed the gulf called "Assacenus Sinus," according to Pliny.

*LEUCATE*, in *Geography*, a town of France, in the department of the Aude; situated on the N. side of a large lake of the same name; 17 miles S. of Narbonne. N. lat. 42° 54'. E. long. 3° 7'.

*LEUCE*, or *ACHILLIS INSULA*, in *Ancient Geography*, an island in the Euxine sea, at the mouth of the Boryithenes. Strabo says, that it was consecrated to Achilles. Sallust, in his Fragments, says that it was of small extent and desert; and that it was famous for a temple, and for the statue and burying-place of Achilles.

*LEUCE*, a small island on the N. coast of the isle of Crete; according to Diodorus Siculus.

*LEUCÆ*, λευκῆ, in *Medicine*, a term nearly synonymous with the *vitiligo* of the Latins, signifies a leprous affection of the skin, of a white colour, with a loss of sensibility in the parts affected, the hair at the same time becoming white, and falling off.

The latest Greek physicians consider the *alphas* and *leucæ* as the same diseases essentially, differing only in degree, and not in kind. The *alphas* they describe as a superficial disease, in which the surface of the skin becomes white, but no farther change takes place: whereas the *leucæ* penetrates below the surface, affecting the flesh, and being much more difficult to heal. They ascribe it to an error in the assimilatory powers, in consequence of which a phlegmy or pituitous and viscous blood is generated, which is incapable of being converted into a proper red flesh, but produces a sort of flesh like that of locusts, and other crustaceous animals: the hairs, at the same time, turn white, and fall off, and the skin becomes smooth and bright, and the parts lose their sensibility; so that they may be pricked with needles, without suffering any uneasiness. In a word, the disease, thus described, is a species of *elephantiasis*, and appears to have been the same thing with the leprosy of the Jews. The Arabians properly call it the *white albaras*: nevertheless, with the later Greeks, they consider it as differing only in degree from the white *albopak*, (or *morphea*, as it has been called by the Latin translators,) which is the *alphas* of the Greeks. Hippocrates, however, seems to distinguish the *leucæ* from the *alphas*: for he observes that the latter should be considered as an external blemish, rather than as a disease; but he speaks of the *leucæ* as a distemper of the most fatal kind. (De Affection. sect. 5.) It would appear, therefore, that the word *alphas* denotes a modification of the scaly disease, the *lepra Græcorum*, and perhaps also an incipient *leucæ*; and that *leucæ* is a variety, a precursor, or a

stage of the *elephantiasis*. In this light Dr. Willan, in his able treatise on cutaneous diseases, considers them. (See that work, p. 124—126.) Celsus has classed the *alphas* and *leucæ*, together with the *melas*, (which differs from the *alphas* only in the blackish colour of the scaly spots,) under one generic term, *vitiligo*: at the same time, he points out the affinity of the *alphas* and *melas*, and the peculiar and distinct features of the *leucæ*. The two former, he says, are commonly a little rough, and not continuous, but dispersed in drops, as it were, here and there: sometimes, indeed, it spreads more extensively, but leaves interstices of the skin unaffected. They are the same in all respects, with the exception of colour. "The *leucæ*," he adds, "has some resemblance to the *alphas*; but it is whiter, penetrates deeper, and the hairs are white and downy. They all three spread, but with different degrees of rapidity in different individuals. The *alphas* and the *melas* appear and disappear in some persons at irregular periods; but the *leucæ* does not readily quit a person whom it has once attacked. The two first are not very difficult of cure: but the last is scarcely ever removed; and if it is at any time alleviated, yet the natural colour of the skin is never entirely restored." (Celsus, de Re Med. lib. v. cap. xxviii.) He then states the observations in regard to the prognosis, which are repeated by the Greek physicians; namely, that if we would ascertain whether the disease be curable or not, we should prick or scratch the skin with a needle. "If blood issues, which generally happens in the two former, the case is remediable; but if a white humour appears, it will not admit of a cure, and therefore we must make no such attempt." (Loc. cit. Compare also Aetius, Tetrabib. iv. ferm. i. cap. cxxxiii. Aëtarius, Meth. Med. lib. ii. cap. xi. Paul. Ægineta, de Re Med. lib. iv. cap. v.) The impaired sense of feeling in the parts is mentioned as an additional symptom of the irremediable state of *leucæ*, by the last named authors. See also Forelius Obs. Chirurg. lib. v. obs. iii.

The appellation of *leucæ* is derived either from λευκός, *leucos*, white, or from λευκή, *leuca*, the white poplar tree, the whiteness of the bark and leaves of which has perhaps been supposed to resemble the condition of the skin in the disease above described. See Gorter. Definit. Med. See also LEPROSY.

*LEUCELECTRUM*, a name given by some authors to that sort of amber which is white and opaque, and usually of a fatty look.

*LEUCHARS*, in *Geography*, a town of Scotland, in Fifeshire, near the German ocean. In 1801 the number of inhabitants was 1687; 6 miles N. of St. Andrews.

*LEUCHTENBERG*, a town of Bavaria, and capital of a landgraviate, to which it gives name; 36 miles E. of Nuremberg. N. lat. 49° 35'. E. long. 12° 11'.

*LEUCHTERSHAUSEN*, a town of Germany, in the margravate of Anspach, on the Altmühl; 7 miles W. of Anspach.

*LEUCI*, in *Ancient Geography*, a long chain of mountains in the isle of Crete, so called from their whiteness, being covered for a great part of the year with snow. They are now known by the names of Madura and Specia.

*LEUCISCUS*, in *Ichthyology*. See DACE.

*LEUCITE*, *Leuzit*, *Wern. Amphigène*, Häüy. *Vesuvian* or *white garnet*, Kirw. *Vulcanit*, *leucolite*, *granatine* (sort of some mineralogists).

Its colour is commonly greyish or yellowish-white, seldom ash-grey, milk-white, or greenish and reddish-white, passing into flesh and tile-red.

It occurs in grains, but most frequently in round crystals

of twenty-four trapezoidal planes, (*Amphigène trapezoidal*, Häuy, p. 147. f. 62.) or, as the form is defined by Werner, low double eight-sided pyramids, in which the lateral planes of the one are set on the lateral planes of the other, while the summits are flatly acuminate each by four planes placed on the alternate edges. They are more or less regular; sometimes perfectly so, at other times rather rounded on the edges. They are crystallized all around, and imbedded. Their size varies from very small to middle-sized; crystals of more than one inch in diameter are, however, seldom seen. No other modification than the trapezoidal has been hitherto observed.

The surface of the grains is rough, and dull or weakly glimmering; that of the crystals glistening and smooth, not striated, as in the garnets of the same form; there are, however, sometimes minute rents seen to run parallel to the short diagonal of the trapezoidal planes. Externally they are glistening, internally shining, with vitreous lustre rather inclining to resinous.

Fracture imperfectly and flat conchoidal, sometimes inclining to foliated; fragments indeterminate angular, more or less sharp-edged.

It occurs commonly slightly translucent, but also nearly transparent, and rarely with perfect transparency.

The leucite is hard in a low degree, scratching glass with difficulty: it is brittle, and easily frangible. Specific gravity, 2,461, Karsten; 2,464, Kirwan; 2,468, Briffon; 2,457 (from Vesuvius), and 2,490 (from Albano near Rome,) Klaproth.

It is infusible before the blowpipe without addition: with borax it melts into a light brown, transparent glass.

The leucite was first analysed by Klaproth, who discovered in it a considerable portion of vegetable alkali; a substance till then unsuspected to form a constituent of mineral substances. Vauquelin's subsequent analysis completely agrees with that given by Klaproth.

Mean of different Analyses.	Klaproth.	Vauquelin.
Silica	54	56
Alumine	24	20
Potash	21	20
Lime	-	2
Loss	1	2
	100	100

Leucite occurs particularly in lava, and also in rocks belonging to the fletz transformation of Werner. It should however be observed, that what has been described by several authors as leucite in basalt, trapp, &c. is nothing but cubic zeolite (analcime of Häuy). Faujas, Elnark, and others have fallen into this error.

Many places have been mentioned where leucite is found; but the best authenticated locality is that of the neighbourhood of Naples, and of Rome. They are found in immense quantities in the mountains of Albano, Tivoli, Caprarola, Viterbo, Aquapendente, Civita Castellana, and Borghetto, where they are seen enveloped in lava, often accompanied by mica, vesuvian, and hornblende.

Von Buch, Salmon, Patrin, and others, are of opinion, that the leucite crystals were formed in the lava when still in a fluid state; Dolomieu and Werner, on the other hand, consider them as having pre-existed in the rocks that were afterwards converted into lava. The idea of other mineralogical writers, who look upon these crystals as being garnets altered by volcanic fire, is now deservedly exploded.

Häuy's name of *amphigène* is derived from the double origin

of the leucite, with regard to its primitive form, which may be either the cube or the rhomboidal dodecahedron.

LEUCOCROTTA, in *Natural History*, the name given by many authors to a beal, supposed to be the swiftest of all creatures in the world: others have called it leucrocotta, but the true name is leocrocotta.

LEUCOGÆA, a name by which some authors have called the substance, more usually known by the name of morochthus, and called in English, French chalk, or Brinon chalk.

LEUCOGRAPHIS, the name used by some of the ancient writers, for the substance commonly called morochthus, or French chalk.

LEUCOBIUM, in *Botany*, a name adopted from the ancient Greek authors, who nevertheless differ about their *species*. That of Theophrastus appears to be the Linnæan *Galanthus*, whilst that of Dioscorides is doubtless, from his short account, the *Cheiranthus*, or Stock. The present genus is nearly allied to *Galanthus*, and having been called *Narcisso-Leucobium* by Tournefort, Linnæus adopted the above generic name. Snow-flake.—Linn. Gen. 160. Schreb. 215. Willd. Sp. Pl. v. 2. 30. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 352. Ait. Hort. Kew. ed. 2. v. 2. 211. Juss. 55. Lamarck. Illustr. t. 230. (Narcisso-Leucobium; Tournef. t. 208.)—Class and order, *Hexandria Monogynia*. Nat. Ord. *Sp. Sp. Sp.*, Linn. *Narcissi*, Juss.

Gen. Ch. *Cal. Sp. Sp. Sp.* oblong, obtuse, compressed, opening at the flat side, withering. *Cor.* bell-shaped, spreading; petals six, equal, ovate, flat, coalescing at the base; their tips thickish and straight. *Stam.* Filaments six, brittle-shaped, very short; anthers oblong, obtuse, quadrangular, erect, distant, bursting in the upper part. *Pist.* Germen inferior, roundish; style mostly club-shaped, obtuse; stigma setaceous, erect, acute, longer than the filaments. *Peric.* Capsule turbinate, of three cells and three valves. *Seeds* numerous, roundish.

Obf. *Leucobium autumnale* and *triciphyllum* have a thread-shaped style.

Ess. Ch. Corolla superior, bell-shaped, of six equal petals, thickened at their summit. Stigma simple. Stamens equal.

1. *L. vernum*. Spring Snow-flake. Linn. Sp. Pl. 414. Curt. Mag. t. 46. Jacq. Fl. Austr. t. 312.—Spatha single-flowered. Style club-shaped.—A native of moist woods and shady places in various parts of Italy, Switzerland, Germany, and the south of France. It flowers in the early spring; its specific name indeed is indicative of this circumstance. *Bulb* oblong, smaller than that of the *Dafodil*. *Leaves* flat, darkish-green, about four or five in number, broader and longer than those of the *Snow-drop*. *Stalk* radical, angular, hollow and channelled, furnished towards the top with a whitish spathe, opening at the side, from whence the flower proceeds. *Corolla* rather large, its petals white, tipped with green. The plant has an agreeable fragrance, something like *Hawthorn*.

2. *L. asivum*. Summer Snow-flake. Linn. Sp. Pl. 414. Engl. Bot. t. 621. Curt. Lond. fasc. 5. t. 23. Jacq. Austr. t. 203.—Spatha many-flowered. Style club-shaped.—First determined to be a native of this island by Mr. Curtis, who found it growing between Greenwich and Woolwich, as well as in the Isle of Dogs. It has since been gathered in many other parts of England, particularly Wiltmoreland, Suffolk, and Berkshire, flowering in May. *Root* a roundish bulb. *Leaves* numerous, erect, a foot and half in length, obtuse, keel'd, bright-green. *Stalk* radical, as long as the leaves, compressed. *Sp. Sp. Sp.* lanceolate, erect. *Partial stalk* solitary and single-flowered. *Flowers* pendulous, white; petals

petals tipped with green. *Antbers* obtuse, burbling by two pores at the summit. *Capsule* elliptical, three-celled. *Seeds* globular, large.

The plant is entirely without smell, but is extremely ornamental, and may be often seen in rustic gardens.

3. *L. autumnale*. Autumnal Snow-flake. Linn. Sp. Pl. 414. Curt. Mag. t. 960. Redouté Liliac. t. 150. f. 2.—*Spatha* many-flowered. Style thread-shaped.—A native of Spain and Portugal, flowering, as its name imports, in the autumn. *Bulb* thickish, of many glutinous coats, covered with a white membrane. *Stalk radical*, about six inches in height, reddish-brown, mostly bearing two or three white, pendulous, inodorous flowers, red at their base. *Leaves* capillary, springing up after the plant has flowered. Curtis however says that in specimens which were sent from Gibraltar, the leaves appeared at the same time with the flowers, though considerably shorter than they afterwards grew.

4. *L. trichophyllum*. Bristle-leaved Snow-flake. Brot. Lufit. p. 1. 552. Redouté Liliac. t. 150. f. 1.—*Spatha* two-leaved, many-flowered. Style thread-shaped.—Gathered on the sandy plains of Barbary, flowering in the midst of winter. *Leaves* thread-shaped, membranaceous. *Stalk radical*, sheathed by the leaves at its base, thread-shaped, five or six inches high. *Flowers* from two to four, pendulous, white, occasionally tinted with red on the outside.

Redouté regrets that he could not call this *hyemale*, as the name of *trichophyllum* had previously been applied by Renaulmius to the last species, to which indeed this is closely allied. The specific name of *hyemale* would have been particularly desirable on account of carrying on the analogy of nomenclature with the three other species. It is greatly to be wished that botanists who give new names to plants would well consider such analogies.

For *L. strumosum*, Ait. Hort. Kew. ed. 1. 407. t. 5, see STRUMARIA.

LEUCOIUM, in *Gardening*, comprehends plants of the bulbous-rooted flowery or perennial kind, of which the species cultivated are the great spring snow-drop (*L. vernum*); the summer snow-drop (*L. æstivum*); the autumnal snow-drop (*L. autumnale*); and the many-flowered Cape leucium (*L. strumosum*). The first has an oblong bulb, shaped like that of the daffodil, but smaller; the leaves are flat, deep green, four or five in number, broader and longer than those of the common snow-drop; the scape angular, near a foot high, hollow, and channelled; towards the top comes out a whitish sheath, opening on the side, out of which come out two or three flowers, hanging on slender peduncles; the corolla is much larger than that of the common snow-drop; and the ends of the petals are green. They appear in March, and have an agreeable scent, not much unlike those of the hawthorn.

The flowers, which at first sight resemble those of the common snow-drop, are easily distinguished by the absence of the three-leaved nectary. They do not come out so soon by a month. The first is called by Mr. Curtis the spring snow-flake.

In order to distinguish the second sort from the galanthus, Mr. Curtis names it the summer snow-flake; and in gardens it is commonly known by the name of the great summer snow-flake, and the late or tall snow-drop.

*Method of Culture*.—These plants are readily increased by off-sets from the roots, which should be separated from the old roots about every third year, in the summer season, as soon as their leaves begin to decay, in the same manner as other bulbous roots. See BULBOUS ROOTS.

They are also capable of being increased by seeds, which

should be sown in the latter end of August, in a border of light bog-earth. The plants should remain in this situation till the second summer, and be then taken up at the proper period, and planted in beds, till they begin to flower, when they should be removed into the borders. In this way they are three or four years before they flower. But by much the best method is to procure the roots from the nurseries, and plant them in the beginning of the autumn, in an eastern or northern border, where the soil is of a boggy quality, in patches of three or four together, in the fronts, putting them in to the depth of about three or four inches.

The off-sets should be planted out in beds a year or two after being taken off, till fit to be set out for flowering.

A soft loamy soil, or a mixture of loam and bog-earth, are the most suited to their healthy growth. The last sort requires protection in the house, with other Cape bulbs.

By planting them in the different aspects mentioned, a longer succession of flowers may be produced.

They are very ornamental in the fronts of the borders, or the sides of the lawns, and other parts near the house, or other public situations.

LEUCOIUM *Indicum* et *lucum*. See STOCK Gilly Flower.

LEUCOIUM *Bulbosum*. See LEUCOIUM, *supra*.

LEUCOLIBANON, in the *Materia Medica* of the Ancients, a name given to the white olibanum, or frankincense, which they carefully distinguish from the reddish or yellowish olibanum. This was also called *argyrolibanum*, or the silver-coloured olibanum; and the yellow one *chalcolibanum*. This latter word is used in the Apocalypse of St. John, and is misunderstood so far, as to be translated brasa, and supposed to be a kind of brasa from Mount Lebanon. See CHALCOLIBANON and FRANKINCENSE.

LEUCOLITHOS, in *Natural History*, a name given by some of the Greek writers to the pyrites argenteus, or silvery pyrites. The ancients had a great opinion of these fossils in diseases of the eyes; they used all the kinds of pyrites, or marcasite, after calcination, for this purpose; but as they distinguished four kinds of them, they attributed these virtues, in different degrees, to the different kinds; therefore they had recourse to so many peculiar names for distinguishing them; and the white kind was called leucolithos, to distinguish it from the dusky one called the iron pyrites, and the deeper and paler yellow kinds, called the gold and brassy marcasites.

LEUCOMA, Λευκομα, among the Athenians, signified a public register of the whole city, in which were written the names of all the citizens, as soon as they came to be of age to enter upon their paternal inheritance.

LEUCOMA (derived from λευκος, white), signifies, in *Surgery*, a whitish opacity of the cornea. Professor Scarpa, of Pavia, has made some interesting remarks on this case in his "Osservaz. sulle Principali Malatien degli Occhi." He informs us, that the albugo and leucoma are very different from what has gone under the name of the nebula of the cornea, since they are not the consequence of a slow chronic inflammation of the eyes, accompanied by a varicose state of the veins, and an extravasation of a thin milky serum into the texture of the delicate layer of the conjunctiva spread over the cornea; but are either produced by a violent acute ophthalmia, wherein a dense coagulable lymph is effused superficially or deeply into the substance of the cornea itself, or else are occasioned by wounds, or ulcers attended with loss of substance. Albugo strictly denotes the first of these cases; leucoma the last, particularly when the scar, or opaque spot, occupies the whole or a considerable portion of the cornea.

A recent albugo, remaining after the subsidence of a violent

violent acute ophthalmia, is of a clear milky colour; but when inveterate, it puts on a chalky or pearl colour, and in this frequently appears to have no vascular connection with the rest of the cornea, occasioning no uneasiness, and being incapable of being absorbed.

Provided the texture of the cornea be not disorganized by the coagulable lymph extravasated in a case of recent albugo, the opacity may often be dispersed by employing, in the first stage, general and local bleeding, internal antiphlogistic medicines, and emollient applications; and in the second stage, mild astringents and corroborants. These last, as soon as the inflammation is subdued, excite the action of the absorbents, by which vessels the opaque extravasated lymph, forming the albugo, is to be removed.

But although a recent albugo may often be dispersed, this object cannot be so easily effected when the disease has existed a long while, in which case the absorbents have frequently lost their activity, and the structure of the cornea become so disorganized, that this membrane must for ever remain opaque at the part affected. According to Scarpa, the circumstances favourable to the cure are a recent state of the disease without disorganization of the cornea, or of the delicate layer of the conjunctiva spread over it, and the patient being young, as at this period of life the absorbents are most capable of action. Scarpa assures us, that he has seen many examples in children, where the specks, left on the eye after a violent ophthalmia, have spontaneously disappeared in the course of a few months.

The following local remedies Scarpa has found most serviceable, both to recent and inveterate cases of albugo. A collyrium, composed of two scruples of sal ammon., four grains of ærugo, and eight ounces of aqua calcis. These are to stand for twenty-four hours, and the liquor then be filtered for use. An ointment, consisting of the subsequent ingredients. R Tutia f. p. ʒj Aloes f. p. Calom. ā ʒi grij. Butyr. recent. ʒʒ. M. Janin's ophthalmia ointment, and the gall of ox, thence, pike, and barbel, applied to the cornea with a hair-pencil, are also favourably spoken of. When the eye was too irritable to bear the preceding application, Scarpa sometimes used with advantage the oil of walnuts, somewhat rancid. Two or three drops were introduced into the eye every two hours, and the plan followed up for several months. He has likewise found the juice of the lesser centaury, mixed with honey, a good application.

How unpromising soever things may seem, the surgeon is to persist in the trial of remedies, at least three or four months, before the case is to be set down as absolutely incurable.

Scraping and perforating the cornea, and forming an artificial ulcer upon it, are all unavailing expedients in cases where the albugo or leucoma is in a state that Scarpa terms inveterate and coriaceous, such measures being the invention of persons quite ignorant of the structure of the cornea, and the principles upon which its transparency is to be restored.

LEUCOMENAS, in *Ichthyology*, a name by which some have called the smaris, a small fish caught in great plenty in the Mediterranean.

LEUCOPETALOS, in *Natural History*, the name of a beautiful stone described by Pliny, as being of a fine gold yellow, variegated with white.

LEUCOPETRIANS, in *Ecclesiastical History*, the name of a fanatical sect which sprang up in the Greek and Eastern churches towards the close of the twelfth century: the fanatics of this denomination professed to believe in a double Trinity, rejected wedlock, abstained from flesh, treated with

the utmost contempt the sacraments of baptism and the Lord's supper, and all the various branches of external worship, placed the essence of religion in internal prayer alone, and maintained, as it is said, that an evil being, or genius, dwelt in the breast of every mortal, and could be expelled from thence by no other method than by perpetual supplication to the Supreme Being. The founder of this enthusiastic sect is said to have been a person called Leucopetrus, and his chief disciple Tychicus, who corrupted, by fanatical interpretations, several books of scripture, and particularly St. Matthew's gospel. Mofheim.

LEUCOPHÆA ANTELOPE, in *Zoology*. See ANTELOPE *Leucophaea*.

LEUCOPHAGIUM, a name given by some physicians to a sort of medical aliment good in consumptions, and other general decays. It is composed of sweet almonds macerated in rose-water with the tender flesh of a capon, all being finally boiled together to a pulp, capable of being passed through a sieve.

LEUCOPHLEGMATIA, in *Medicine*, from λευκος, white, and φlegμα, pituita, phlegm, a term applied to the droplets of the skin, or anasarca, in consequence of the very pallid hue of the skin and complexion under such circumstances.

Dr. Cullen remarks, that the terms *anasarca* and *leucophlegmatia* have been commonly considered as synonymous; but some authors have proposed to consider them as denoting distinct diseases. The authors who are of this last opinion, employ the name of *anasarca* for that disease which begins in the lower extremities, and thence gradually extends upwards; while they term that *leucophlegmatia*, in which the same kind of swelling appears, even from the beginning, very generally over the whole body, and in which there appears to be a greater deficiency of the blood; such as occurs after profuse hæmorrhages, or other great evacuations. The distinction, however, is principally verbal. See ANASARCA, and DROPSY.

LEUCOPHRA, in *Zoology*, a genus of the class Vermes, and order Infusoria: this worm is invisible to the naked eye, and every where ciliate. There are eight species, of which four are found in the waters or marshes of our own country.

#### Species.

CONFLICTOR. Spherical, sub-opaque, with moveable intestines; it is found in clear water; is of a yellowish colour, with dark edges, and filled with very minute molecules in perpetually violent agitation. This animalcule is described and figured in Adams' Essays on the Microscope. It is said to be rather a heap of animalcules than a single individual, is larger than most species of the vorticella, perfectly spherical, and semi-transparent. It rolls at intervals from right to left, but seldom removes from the spot where it is first found. In proportion to the number of molecules above-mentioned, which are accumulated on one side or the other, the whole mass rolls either to the right or left; it is then tranquil for a short time, but the conflict becomes more violent, and the sphere moves the contrary way in a spiral line. It is a fine object for the microscope, but requires to be observed with much attention. When the water begins to fail, the little creatures assume an oblong, oval, and even cylindrical figure; the hind part of some being compressed into a triangular shape, and the transparent part ebbing as it were from the intestines, which continue to move with the same violence till the water wholly fails, when the molecules are spread into a shapeless mass, which soon vanishes,

and the whole shoot into a form, having the appearance of crystals of sal-ammoniac. See Adams, p. 500.

**VESICULIFERA** is ovate with vesicular interlines. This animalcule is a sort of mean between the orbicular and oval, very pellucid, with a defined dark edge, and inside containing some very bright vesicles or bladders. The middle frequently appears blue, and the vesicles seem as if set in a ground of that colour. The accounts given of this animalcule by Spallanzani and Müller differ in some respects; the latter, however, admits that he once saw an individual like those described by Spallanzani.

**ACUTA.** The oval leucopha, which is round, with a black point at the edge.

**FLUXA.** Sinate, kidney-shaped; body oblong, yellowish, obtuse on one part, the other produced into a cone, and generally filled with molecules.

**ARMILLA.** Round, annular; body thickened above and bent like a ring.

**CORNUTA.** Inversely conic, green, opaque. This animalcule has a resemblance to certain species of the vorticella, and requires to be observed some time before its peculiar characters can be ascertained: the body is composed of molecular vesicles, of a dark green colour, for the most part it is like an inverted cone, the fore-part being wide and truncated, with a little prominent horn, or hook, on both sides; the hind-part is conical, ciliated, the hairs exceedingly minute; those in the fore-part are three times longer than the others, and move in a circular direction. The hinder part is pellucid, and sometimes terminates in two or three obtuse pellucid projections. The animalcule will at one moment appear oval, at another reniform, and ciliated at the fore-part; but at another time the hairs are concealed. When the water which contains it evaporates, it breaks and dissolves into molecular vesicles. It is found late in the year in marshy grounds. See Adams, Pl. 25.

**HELICLIATA.** Cylindrical, obtuse on the fore-part, the hind-part furnished with a double crested organ, which it can thrust out and draw in at pleasure. To the naked eye it appears like a white point; intestines visible by a microscope, when it seems a cylindrical body; the fore-part obtusely round, the middle rather drawn in, the lower part round, but much smaller than the upper part. With a lens of pretty high power the whole body is found to be ciliated.

**NODULATA.** Ovate-oblong; depressed, with a double row of tubercles. This species is found in the intestines of the *Lumbricus terrestris*, and *Nais littoralis*; it is very pellucid, shining like silver, and is propagated by a transverse division; it is of an oval shape when young, and growing more oblong with age; it is truncate at the tip.

**LEUCOPIPER,** in the *Materia Medica*, a name by which some authors have distinguished the white pepper.

**LEUCOPOGON,** in *Botany*, so named by Mr. Brown, from λευκος, *white*, and πικρον, *a beard*, on account of the white erect hairs on the upper side of the segments of the corolla, very conspicuous even in dried specimens. Brown. Prodr. Nov. Holl. v. 541. Ait. Hort. Kew. ed. 2. v. 1. 323. (Perejia; Cavan. Ic. v. 4. 29.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Eparicidez*, Brown.

Gen. Ch. *Cal.* Perianth interior, of seven leaves, erect, permanent; the five innermost equal, lanceolate, concave; two outer ones ovate, opposite, much shorter. *Cor.* of one petal, funnel-shaped, limb in five spreading equal segments, longitudinally bearded on the upper side, with dense, erect hairs. Nectary glandular, surrounding the base of the germen. *Stam.* Filaments five, thread-shaped, equal, inserted into the tube; anthers incumbent, oblong, bursting length-

wise, rising just above the tube. *Pist.* Germen superior, roundish; style short, columnar; stigma obtuse. *Peric.* Drupa more or less succulent, or sometimes dry when ripe, sometimes crustaceous. *Nut* of from two to five cells, with one or two pendulous seeds in each.

Eff. Ch. Outer calyx of two leaves. Corolla funnel-shaped; its limb spreading, longitudinally bearded. Filaments included in the tube. Drupa of from two to five cells.

In the *Prodromus* of Mr. Brown, so rich in botanical novelties, we find the definitions of forty-eight species of this new genus, which he has separated from the *Styphelia* of preceding writers; retaining in the latter such plants only as have four or more leaves to their external calyx; a more elongated and cylindrical corolla, with five internal tufts of hair near the bottom, the limb revolute as well as bearded; filaments prominent; and a rather dry drupa, always of five cells.

*Leucopogon* is divided into five sections, of each of which we shall give some examples.

1. *Spikes axillary, many-flowered. Drupa juicy.* Six species.

*L. lanceolatus.* Brown n. 1. (*Styphelia lanceolata*; Smith Bot. of New Holland, 49; excluding the synonyms from both authors.)—Spikes drooping, aggregate. Fruit oval, of two cells. Leaves lanceolate, flat; many-ribbed beneath; with three furrows above. Branches smooth.—Sent dried from Port Jackson, New South Wales, by Dr. White, in 1793. The living plant we believe has never been brought to this country; *L. lanceolatus* of the new edition of Hort. Kew. being certainly *Styphelia parviflora* of Andr. Repof. t. 287; *S. Cnidium*, Venten. Malmaif. t. 23, which appears to us a very different species, rather agreeing with the characters of *L. apiculatus*, Brown n. 7.—The true *lanceolatus* is a larger shrub, with copious, slender, leafy, round branches, usually quite smooth, sometimes very minutely downy; the young ones reddish, becoming angular and striated when dried. Leaves scattered, slightly spreading, sessile, lanceolate, flat, sharp-pointed, entire, smooth, above an inch, but rarely approaching to two, in length, a quarter of an inch broad; of a full rather glaucous green above, and marked with three fine, often obsolete, furrows, from the base to the middle; the under side paler, with numerous, branching, parallel ribs. *Stipulas* none. *Spikes* clustered about the ends of the branches, spreading or drooping, nearly the length of the leaves, slender, loose, many-flowered, the common stalk slightly downy. *Flowers* small, white, sessile. *Bractees* solitary under each flower, ovate, concave, ribbed, downy-edged, of the size and exact appearance of the two outer calyx-leaves, placed contrary to them, permanent. Inner calyx-leaves twice as long as the outer, and smoother, rather shorter than the tube of the corolla, whose limb is reflexed, with a tolerably dense, but not very white beard, at least in the dried specimen. *Drupa* of two cells, oval, twice as long as the inner calyx-leaves, crowned by the style, which is about a third of its length.

*L. verticillatus.* Brown n. 6.—Spikes mostly terminal, aggregate; drooping when in fruit. Drupa of five cells, five-sided. Leaves interruptedly clustered, somewhat whorled, oblong-lanceolate, taper-pointed. Gathered by Mr. Brown on the southern coast of New Holland. We have what answers to his description from King George's sound, on the west coast, communicated by Mr. Menzies. It is much larger than the preceding. Leaves from two to three or four inches long, and three quarters or more broad, somewhat roughish to the touch, marked on both sides with five ribs, besides innumerable oblique lateral ones beneath;

four or five growing together in a sort of whorls. The lateral branches are also often whorled. Spikes much as in the last, but longer. Bractæas ribbed, smooth, twice as large as the outer calyx-leaves.

2. *Spikes axillary, sometimes terminal, of three or more flowers. Calyx and bractæas coloured. Drupa rather dry. Leaves not heart-shaped.* Fourteen species.

*L. apiculatus.* Brown n. 7. (*Styphelia parviflora*; Andr. Rcpof. t. 287? *S. Gnidium*; Venten. Malmalf. t. 23?)—Spikes terminal, somewhat aggregate, of five to seven flowers. Bractæas lanceolate, rather larger than the outer calyx-foales. Leaves lanceolate-oblong, erect, slightly concave, callous-tipped, smooth at the edges. Drupa crustaceous, turbinate, depressed, shorter than the calyx.—Gathered by Mr. Brown on the south coast of New Holland. He observed a smooth variety and a downy one, which he suspects may be distinct species.—The above characters most minutely answer to the above plant of Andrews, raised from New Holland seeds, and to be seen in several greenhouses, flowering in May. It is a small *shrub*, with apparently deciduous, rather glaucous leaves, hardly an inch long, smooth, with little, dense, upright, usually solitary, terminal spikes, of pretty snow-white flowers.

*L. revolutus.* Brown n. 13.—Spikes mostly terminal, aggregate, of four or five flowers. Calyx and bractæas minutely downy, the latter half the size of the outer calyx-foales. Leaves rather spreading, linear-oblong, obtuse, with a blunt callous point; convex and rough above; smooth and furrowed beneath; the edges reflexed and naked. Branches finely downy. Drupa dry, obovate, with five cells.—Found by Mr. Brown on the south coast of New Holland, and by Mr. Menzies at King George's sound. It is not very unlike the last, but the leaves are smaller, more spreading, and rough on the upper side with minute points. The flowers are larger, and very conspicuous for the long white hairiness of their segments.

*L. ericoides.* Brown n. 17. (*Styphelia ericoides*; Smith Bot. of New Holl. 48. *Epacris spuria*; Cavan. Ic. v. 4. 27. t. 347. f. 1.)—Spikes copious, axillary, solitary, of three or four flowers. Leaves oblong-linear, spreading, sharp-pointed; recurved at the edges; roughish above. Bractæas pointless. Inner calyx-leaves membranous. Drupa dry, angular.—Native of New South Wales, and of Van Diemen's land. A bushy *shrub*, with leaves scarcely half an inch long, almost every one of which is accompanied by a much shorter axillary spike of three or four flowers. The segments of the corolla are straight and sharp, looking reddish (as Cavanilles describes them) when dry, elegantly bearded with white hairs, which, as the flowers open, seem to form a dense web in the mouth of each.

To this section also belong, among others, the *Styphelia*, tab. 64, 65, 66, 67, of Labillardiere.

3. *Spikes axillary or terminal. Leaves heart-shaped. Calyx and bractæas membranous or leafy.* Five species.

*L. amplexicaulis.* Brown n. 21. (*Styphelia amplexicaulis*; Rudge Tr. of Linn. Soc. v. 8. 292. t. 8.)—Spikes axillary and terminal, spreading, stalked, longer than the leaves, which are heart-shaped, pointless, clasping the stem; minutely downy beneath; recurved and fringed at the edge. Branches hairy. Drupa lenticular, of two cells.—Found near Port Jackson. The stems are several from one root, mostly simple, round, reddish, clothed with fine horizontal hairs. Leaves spreading, near an inch long, half an inch wide, with many ribs. Calyx and bractæas smooth, acute. Segments of the corolla recurved, very hairy. Drupa compressed, oblique.

*L. difflans.* Brown n. 23.—Spikes terminal, aggregate,

zigzag. Flowers distant. Leaves ovate, somewhat heart-shaped, deflexed, pointless, minute; convex above; downy beneath. Drupa crustaceous, obovate, flat-topped, of five cells.—Gathered at King George's sound by Mr. Menzies, to whom Mr. Brown, like ourselves, was indebted for specimens. The branches are long, clothed with numerous little reflexed convex leaves. Spikes very peculiar, being long, slender, with remarkably zigzag, downy stalks. Bractæas heart-shaped, concave, ribbed, permanent. Calyx-leaves very broad. Segments of the corolla recurved, very densely bearded.

4. *Spikes terminal. Calyx and bractæas rather leafy. Drupa dry. Leaves not heart-shaped.* Eight species.

*L. microphyllus.* Brown n. 26. (*Petroja microphylla*; Cavan. Ic. v. 4. 29. t. 349. f. 2.)—Spikes clustered, of few flowers. Leaves of the calyx pointed, half membranous. Bractæas leafy, ribbed. Leaves oval, flat, obtuse, pointless; of the same colour on both sides. Drupa crustaceous, of one or two cells.—Native of the neighbourhood of Port Jackson. A pretty little *shrub*, with minute, rather imbricated, smooth, thickish leaves. The little spikes of flowers, clustered about the ends of each branch, form round heads. The inner leaves of the calyx are narrow, acute, smooth, and thin. Segments of the corolla thick, recurved, very densely covered with white hairs, as in *L. difflans*, and indeed the generality of the species.

5. *Stalks axillary, two-flowered; here and there only single-flowered; in which case there are several bractæas. Drupa dry.* Fifteen species.

*L. acuminatus.* Brown n. 37.—Stalks very short, erect, mostly two-flowered. Leaves nearly upright, linear-lanceolate, very sharp, flat, with a bristly point; their margins rough, finely toothed.—Found by Mr. Brown in the tropical part of New Holland, as are six others of this section, one of them, *L. ruscifolius*, having been discovered there by sir Joseph Banks. Most of the rest are natives of Port Jackson, but none of them have come under our inspection.

This is, on the whole, a very elegant as well as natural genus, and it is to be regretted that only one of the species has hitherto been made known to our cultivators of curious plants. The plummy whiteness of the flowers gives a striking and peculiar aspect to the whole.

LEUCOPSIS, in *Zoology*, a genus of the Hymenoptera order, of the class Insecta. The mouth is horny with short jaws; the mandible thick and three-toothed at the tip; the lip, which is longer than the jaw, is membranaceous, and emarginate at the tip; it has four feelers, short, equal, and filiform; antennæ short and clavate; thorax with a long lanceolate scale beneath; wings folded; sting reflexed and concealed in a groove of the abdomen. There are four species, all foreign insects; three found in the fourth of Europe, and one in Tranquebar.

#### Species.

GIGAS. Black; thorax with two dorsal yellow dots; abdomen sessile, with four yellow bands. It inhabits France; the wings are dusky; hind-thighs with numerous teeth.

DORSIGERA. Abdomen sessile, black, with two yellow bands, and a dot between them. It is found in Italy, Switzerland, France, and some parts of Germany. Head is black; thorax gibbous, black with a double transverse yellow line; abdomen compressed and grooved on the back; sting double, as long as the abdomen, and reflexed back into the abdominal groove; legs yellow, spotted with black; hind legs toothed, with a black spot. This beautiful insect is figured in Adams' work on the microscope; the drawing was taken from a specimen in her present majesty's cabinet of insects.

There is one also in the cabinet of Linnæus, now in the possession of our very able coadjutor, Dr. Smith, P. L. S. It appears at first sight like a wasp, to which genus the folded wings would have referred it, had not the remarkable sting or tube on the back have prevented it. It is thought to be a species between, and uniting the sphæx and wasp, in some degree partaking of the characters of both. The antennæ are black and cylindrical, increasing in thickness towards the extremity; the joint nearest the head is yellow; the head is black; so also is the thorax, encompassed with a round yellow line, and furnished with a cross one of the same colour near the head. The scutellum is yellow; the abdomen black, with two yellow bands, and a spot of the same colour on each side between the bands. The anus and the whole body, when viewed with a low magnifier, appear punctuated, and the points, when examined carefully, seem to be hexagonal, and in the centre of each hexagon a small hair is seen.

**PETIOLATA.** Black; abdomen petiolate ferruginous; the petiole with a yellow dot each side. It is found in Tranquebar. The thorax is elevated, with two yellow streaks before; under the scutellum is a yellow dot; the second segment of the abdomen is edged with yellow, and the tail is black; legs black edged with yellow; wings black.

**CELOGASTER.** Abdomen sessile; scale of the thorax half as long as the abdomen. It is found in some parts of Germany. The thorax has a yellow band behind, and the eyes are black.

**LEUCORRHEA,** in *Medicine*, λευκορροία, literally signifying *fluor albus*, or *white flux*, is a disorder of the uterus or its passages, from which a whitish or pale coloured fluid is discharged, accompanied by pain in the loins, considerable loss of strength, and a weakly aspect. It is commonly expressed by the appellation of "*the whites*" by the patients, or is simply called "a weakness."

Every serous or puriform discharge from the vagina has been comprehended under this appellation: it is obvious, however, that such discharges may be various, and may proceed from various sources. They may proceed more especially from the vessels of the uterus itself, or from those of the vagina only. In the latter case, which is probably not a very common occurrence, the cause of the excretion must be purely local: it sometimes happens during the period of pregnancy. In these instances, there must be either a local weakness and relaxation of the parts, or some irritation may exist or have been applied, so as to excite the mucous glands, the secretion from which serves to lubricate the parts, to pour out their fluids in an unusual quantity. The existence of little aphthous ulcerations within the labia sometimes gives rise to such a discharge, in which case there is also a considerable degree of soreness and tenderness in the parts; and the use of those instruments, called pessaries, has been said to produce a fluor albus, from the pain and irritation which they occasion.

In general, however, the discharge of leucorrhœa proceeds from the same vessels of the uterus itself which pour out the catamena. This inference may be deduced from the following circumstances. In the first place, the leucorrhœa is most common in those women who are subject to an immoderate flow of the menses. Secondly, it appears principally, and often exclusively, a little time preceding, and again posterior to the menstrual discharge; the latter diminishing in proportion as the leucorrhœa is increased, or seeming to be converted into the leucorrhœa. Thirdly, the leucorrhœa often continues after the period when the catamena have altogether ceased, and frequently shews a considerable tendency to a periodical recurrence. And lastly,

it is commonly accompanied with the same local and constitutional symptoms as an excessive flow of the menses; such as paleness of the countenance, a feeble pulse, an unusual debility on taking exercise, a hurry of the breathing from even moderate exertion; and at the same time the back becomes pained by any continuance in the erect posture, the extremities are frequently cold, and some œdema affects the feet in the evening. The debility also manifests itself by affections of the stomach; such as loss of appetite, flatulence, and other symptoms of indigestion; by palpitations of the heart, with frequent sensations of sinking and fluttering about the epigastric region, and even actual syncope; and by a depression of spirits, and a weakness of mind liable to strong emotions from slight causes, especially when operating suddenly; in a word, by all the train of distressing symptoms which have been denominated *nervous*. The inference, that the discharge is uterine, is farther confirmed, when it is observed, that it had neither been preceded nor accompanied by any symptoms of a local affection of the vagina; and that it had not appeared soon after communication with a person who might be suspected of giving infection; nor had, from the first appearance, been accompanied with any inflammatory affection of the pudenda.

The last observation applies particularly to the diagnosis of the discharge of leucorrhœa and that arising from venereal infection; a point which is worthy of more particular consideration. It is very easy to distinguish a simple leucorrhœa from a recent gonorrhœa; for besides the general debility, and the nervous symptoms above-mentioned, which frequently accompany the former, the colourless nature of the discharge, which only thickens, without staining the linen, and the absence of all heat and scalding on passing the urine, together with the cessation of the discharge at the time of menstruation, sufficiently characterize the leucorrhœa; whilst in the gonorrhœa there is itching, inflammation, and heat of urine, the orifice of the urinary passage is prominent and painful, there is frequent irritation to make water, and the discharge stains the linen of a yellow or greenish colour. But it must be remembered, that the discharges from the vagina, which have been denominated leucorrhœa, are sometimes opaque and of a yellowish colour, and sometimes accompanied with a degree of ardor urinae and inflammation of the external labia. This may happen in women of bad habit of body, or where there is ulceration in the vagina or uterus; but in both these cases the discharge is of a sanious nature, and very offensive; and in the latter is commonly accompanied with severe pains in the region of the uterus, and extending from the loins round the pelvis to the groins, and even down the thighs. The discharge is sometimes fo acrimonious, in these instances, as to inflame and excoriate the passages. In the herpetic or aphthous affection of the orifice of the pudendum, there is heat of urine with the discharge; but the discharge is very scanty, and the labia extremely tender and sore, so as scarcely to admit of sitting, except upon a soft seat; which does not take place either in proper leucorrhœa, or in gonorrhœa in general. In many cases, the circumstances of the patient, which render it either impossible or in the highest degree improbable that any infectious connection can have taken place, will of course admit of no hesitation in the decision; and it is often upon these circumstances alone that the practitioner is obliged to depend in forming his opinion.

The *causes* of leucorrhœa are chiefly to be sought for among those agents and circumstances, which tend to produce a debility of the system in general, or of the uterus in particular. Of the former kind, are imperfect diet, fatigue, anxiety, and much watching; the practice of suck-

ling children too long; damp, clofe, and uncleanly habitations; caufes which chiefly operate among women of the lower clafs. To thefe may be added, the almoft total want of proper exercife, living too much in warm chambers, and drinking much of warm enervating liquors, fuch as tea and coffee, which influence principally women of better ftations. The fources of local debility to the uterine fyftem itfelf are many; fuch as blows, bruises, and falls; frequent abortions, or frequent child-bearing without nurfing, difficult and tedious labours, profufe difcharge of the catamenia, or of the lochia after delivery; venus immodica; &c.

On the other hand, the effect of leucorrhœa, efppecially when it has continued long, is, in many cafes, to prevent conception and occafion barrennefs; or, if conception take place, to produce a fucceffion of mifcarriages; not to mention the conftitutional and nervous derangement already defcribed. However, if the leucorrhœa be moderate, and be not accompanied with any confiderable overflow of the catamenia, it may often continue long without inducing any great degree of debility; and it is only when the difcharge has been very copious, as well as conftant, that its effects in that way are very remarkable.

The means of cure will confift of thofe expedients which contribute to ftrengthen the general habit, and the uterine fyftem locally. The fyftem generally is to be fupported by all thofe means which regimen, diet, and medicine contribute; namely, by light and nutritious diet; by moderate exercife, by fome means of geftation, as in a carriage, on horfeback, or failing (the exercife of walking, both from the conftant erect pofture, and the action of the mufcles, being liable to produce irritation, and to augment the uterine difcharge); by the ufe of the tepid or cold bath, according to the ftrength of the patient, and the feafon of the year; by drinking the chalybeate mineral waters; or by taking fome of the preparations of iron in the way of medicine, efppecially the muriated tincture, or the fulphate, together with the cinchona, or other vegetable tonics. The mineral acids are fometimes beneficial under the fame circumftances.

The uterus itfelf and its connections may be ftrengthened either by direct local applications, or by internal medicines, which are commonly determined to the urinary paffages, and from the vicinity of thefe are often communicated to the uterus. Thefe laft mentioned medicines are cautharides, turpentine, and balfams of a fimilar nature; by which the difeafe has often been relieved or even cured. The former clafs includes a variety of astringent lotions and injections, by which the difcharge may alfo be often diminiſhed, and in young women, when the complaint is recent, entirely cured. Thus the parts may be wafhed twice or three times a day with a weak folution of the acetite of lead, or of alum, in rofe water; or an infufion of rofe leaves, or of green tea, or the chalybeate mineral waters, make very proper lotions: or thefe liquors may be thrown into the vagina twice a day, through an ivory pipe, by means of the elaftic gum. But in general injections are unwillingly ufed, unlefs when the difeafe is inveterate. When the matter difcharged is acrimonious, and inflames and excoriates the parts, or excites very troublefome and painful itching, the greateft relief is obtained by keeping the parts clean and cool, removing the acrimonious matter frequently by bathing with cold water, or with any of the above-mentioned astringent liquors.

Dr. Hamilton remarks, that women have, in many inftances, been cured of the moft obftinate habitual fluor albus by giving fuck. See his Treatife on Midwifery, pt. i.

chap. i. p. 68. See alfo Cullen, Firft Lines, § 985. Leake on the Chron. Dif. of Women.

LEUCORIDIUS, in *Ornithology*, a name by which fome have called the platea, or ſpoonbill, a very remarkable kind of ftork or heron.

LEUCORYX, ANTILOPE or *Antelope leucoryx*, in *Zoology*, the Gazella Indica, having angular horns, of Nov. Com. Petrop. xiii. 470. l. 10. f. 5. Oryx of Oppſan, Cynæg. ii. v. 445, leucoryx of Pennant, is a ſpecies of Antelope, which has very long, ſlender, upright, taper, ſharp-pointed horns, very ſlightly bent backwards and annulated at the baſe; the body being of a milk-white colour. It inhabits the iſland of Gow Bahreia, in the bottom of the Perſian gulf, near Baſſora. It is about the ſize of a Welch runt or ſmall cow; the head is large and broad, with a thick broad noſe, like that of a cow, and ſomewhat flouching ears; the body is thick and clumsy, and the whole is of a pure white except the middle of the face, the ſides of the cheeks, and the limbs, which are tinged with red: the tail is longiſh, and is tufted at the end with a brush of hairs; the horns are of a black colour. Dr. Pallas mentions a horn, apparently belonging to this animal, or ſome ſpecies nearly reſembling it, which was found in a foſſile ſtate, in Siberia. The female comes into ſeaſon in autumn, and brings forth in ſpring.

LEUCOSCEPTRUM, in *Botany*, a new genus named by Dr. Smith, is derived from λευκος, white, and ſκεπτρος, a ſceptre, on account of its elegant ſceptre-shaped ſpike of white flowers. The author of this genus remarks that “it has the habit of a *Buddleia*, but belongs to the ſecond ſection of *Vitices* in Juſſieu, near *Verbena*; and ſhould, along with *Verbena*, ſtand near *Mentha* in the Linnæan ſyſtem.”—Sm. Exot. Bot. v. 2. 113.—Clafs and order, *Didymia Gynnoſpermia*. Nat. Ord. fee above.

Eff. Ch. Corolla unequal, in four ſegments; the uppermoſt deeply cleft. Calyx five-cleft. Stamens declining, much longer than the corolla, parallel. Seeds four.

1. *L. canum*. Hoary *Leucosceptrum*. Sm. Exot. Bot. t. 116.—This is the only ſpecies known, and was gathered by Dr. Buchanan in the woods of Upper Nepal, where it flowers in December, and is called *Mufſola* by the Navars. The branches are obtuſely quadrangular, compressed, clothed with fine, denſe, whitifh pubeſcence. Leaves on ſhortiſh, downy footſtalks, oppoſite, elliptical, pointed and tapering at both ends, bluntly ferrated, veiny; green and naked above; white and downy beneath. Spike terminal, ſolitary, ſeſſile, erect, cylindrical, denſe, many-flowered. Bractææ ſmall, in four rows, oppoſite, each common to many flowers. Calyx tubular, downy; its margin obtuſe, unequally five-cleft. Corolla longer than the calyx, with a ſhort tube; the limb in four, very unequal, obtuſe ſegments, of which the uppermoſt is deeply divided; the lowermoſt, or lip, large, concave, and entire. Stamens declining, parallel, thread-shaped, ſmooth; the two longeſt double the length of the lip. Anthers roundiſh, two-lobed, yellowiſh. Germen ſuperior, four-lobed. Style declining, as long as the longer ſtamens, with a ſlove, acute ſigma. Seeds four, truncated, naked, in the bottom of the calyx.

This is one of the numerous ſplendid plants ſent by Dr. Buchanan, from the mountains of Nepal, to Dr. Smith, which fo greatly enrich the work whence the above deſcription is chiefly taken.

LEUCOSPERMUM, fo named by Mr. Brown, from λευκος, white, and ſπερμα, the ſeed. Brown Tr. of Linn. Soc. v. 10. 95. Ait. Hort. Kew. ed. 2. v. 1. 195. (*Leuca-dendron*; Salif. Parad. t. 116. Proteæ, ſect. 3, pitillius capitatis; Linn. Mant. 2. 191.)—Clafs and order, *Tetrandria Monogynia*.

*Monogynia*. Nat. Ord. *Aggregate*, Linn. *Protea*, Juss. *Proteaceae*, Brown.

Gen. Ch. *Cal.* Common Perianth of numerous single-flowered scales, collected into a head, either permanent and hardened, or membranous and deciduous. *Cor* Petals four, irregular, linear; three of them cohering by their lower part; the fourth separate and narrower. *Stam.* Filaments four, short, inserted into the petals; anthers linear, concealed by the petals, of two cells, bursting lengthwise. *Pist.* Germen superior, sessile, roundish; stigma cylindrical, rigid, deciduous; stigma swelling, smooth, somewhat oblique. *Peric.* Nut tumid, smooth, single-seeded.

Eff. Ch. Petals four, unequal, three of them cohering by their lower part. Anthers sunk in the hollows of the upper part of the petals. Style deciduous. Stigma swelling, smooth. Nut superior, sessile, tumid, smooth.

Eighteen species are defined by Mr. Brown, all natives of southern Africa, about the Cape of Good Hope, growing for the most part in dry, sandy, rather elevated situations. Eight of them are cultivated in the Royal Garden at Kew. The whole are divided into two sections; the first having a rounder head of flowers, whose calyx-scales are permanent, becoming somewhat hardened, of which description are fourteen species; the remaining four have a flatter common receptacle, with narrow deciduous scales, of which the innermost are very thin and chaffy. All are *shrubs* of rather humble growth, rarely arborecent; many of them downy or hairy. *Leaves* either entire, or furnished with callous teeth at the extremity. *Flowers* yellow, in terminal heads.

An interesting specimen of this genus is

*L. tomentosum*. Brown. n. 13. Ait. Hort. Kew. n. 7. (*Protea tomentosa*; Willd. Sp. Pl. v. 1. 514. Linn. Suppl. 118. P. candicans; Andr. Repof. t. 294.)—Style nearly the length of the corolla. Stem erect. Leaves linear or wedge-shaped, downy, three-toothed. Calyx-scales lanceolate, nearly equal to the tube of the corolla.—This is said to be very rare in England. Mr. Masson sent it from the Cape to Kew in 1789, and Messrs. Lee and Kennedy raised it from seed the year following. The whole *shrub* is clothed with fine short down of a glaucous hue, the *stem* rather hairy. *Leaves* two inches long, various in breadth, spreading, coriaceous, dilated outwards, bluntly and unequally three-toothed at the end. Heads of *flowers* produced in August and September, terminal, solitary, sessile, about the size of a walnut, variegated with orange and yellow, their scales tipped with dark brown. Few of the Proteaceous tribe are more difficult to increase by cuttings.

LEUCOSTAPHYLOS, a name given by some authors to the water-elder, or opulus.

LEVE, *Fr.* in *Music*, the *up*, an unaccented part of a bar in beating time. See ARSIS, and ACCENT, in *Music*.

LEVEL, a mathematical instrument used for drawing a line parallel to the horizon, and continuing it out at pleasure; and, by this means, for finding the true level, or the difference of ascent or descent between several places, for conveying water, draining fens, placing the surfaces of floors, &c. level, and for various other purposes in agriculture, architecture, hydraulics, surveying, &c.

The word comes from the Latin *libella*, the cross beam that forms the brachia of a balance, which, to be just, must stand horizontally.

There is a great variety of instruments of this kind, differently constructed, and constituted of different materials, according to the particular purposes to which they are ap-

plied, as the carpenters' level, masons' level, balance level, mercurial levels, surveying and spiral levels. But, however their construction may vary, they may be all referred to the following three classes: *viz.* 1. Those in which a vertical line is determined by a suspended plumb-line, or a balance weight, and the horizontal position is shewn by a line perpendicular to it. 2. Those which determine a level line by the surface of a fluid. 3. Spirit-levels, which point out the horizontal direction by a bubble of air floating in a fluid contained in a glass tube. For the purposes of agriculture, those of the improved water, air, spirit, and foot kinds are most commonly used.

Those of the first kind, depending upon the plumb-line, are very common, but not very accurate: the simplest form is that of two rulers, united together in the form of the letter L; they must be exactly perpendicular to each other: then if a plumb-line is suspended from the top of the vertical ruler, and the edge thereof be made to coincide with the plumb-line, the other ruler must be horizontal. This, when applied to the top of a wall, a beam, or floor, will shew if they are horizontal. This is the kind of level used by artificers: sometimes it is found like the letter A, of three rulers, the plumb-line being suspended from the vertex, and the two legs set on the surface to be levelled. The line hangs opposite to a mark, made on the middle of the cross ruler, when the feet are on the same level. Besides these there are many other forms. For an instrument of this kind, see *Plate IV. Surveying, fig. 5.*

LEVEL, *Plumb*, or *Pendulum*, that which shews the horizontal line by means of another line perpendicular to that described by its plummet, or pendulum.

It consists of two legs, or branches, joined together at right angles, whereof that which carries the thread or plummet is about a foot and a half long. This thread is hung towards the top of the branch, at the point 2. The middle of the branch where the thread passes is hollow, that it may hang free every where but towards the bottom, where there is a little blade of silver, whereon is drawn a line perpendicular to the telescope. The said cavity is covered by two pieces of brass, making, as it were, a kind of case, lest the wind should agitate the thread; for which reason the silver blade is covered with a glass G, to the end that it may be seen when the thread and plummet play upon the perpendicular. The telescope 1 is fastened to the other branch, or leg, of the instrument, and is about two feet long, having a hair placed horizontally across the focus of the object-glass, which determines the point of level, when the string and plummet hang against the line on the silver blade.

All the accuracy of this instrument depends on the telescope's being fitted at right angles to the perpendicular. It has a ball and socket, by which it is fastened to its foot; and is said to have been the invention of M. Picard.

Here we may introduce an account of other levels constructed on the same general principle. For the *foot-level*; see *Foot-level*.

LEVEL, *Artillery-foot*, is in form of a square, having its two legs, or branches, of an equal length; at a juncture of which is a little hole, whence hangs a thread and plummet, playing on a perpendicular line in the middle of a quadrant; it is frequently divided into 90 degrees, or rather into twice 45 degrees from the middle. See *fig. 6.*

This instrument may be used on other occasions, by placing the end of its two branches on a plane; for when the thread

thread plays perpendicularly over the middle division of the quadrant, that plane is assuredly level.

To use it in gunnery, place the two ends on the piece of artillery, which you may raise to any proposed height by means of the plummet, whose thread will give the degree above the level.

*LEVEL, Carpenters' and Paviors'*, consists of a long ruler, in the middle whereof is fitted, at right angles, another somewhat bigger, at the top of which is fastened a line with a plummet; which, when it hangs over a fiducial line at right angles with the base, shews that the said base is horizontal.

This and the masons' level, though very common, are esteemed the best for the practice of building, though the operations by them can only be short.

*LEVEL, Gunners'*, for levelling cannons and mortars, is an instrument represented in *Plate IV. Surveying, fig. 7*, consisting of a triangular brass plate, about four inches high: at the bottom of which is a portion of a circle, divided into  $45^\circ$ , which number is sufficient for the highest elevation of cannons and mortars, and for giving (not the greatest) range. On the centre of this segment of a circle is screwed a piece of brass, by means of which it may be fixed, or moved, at pleasure. The end of this piece of brass is made so to serve for a plummet and index, in order to shew the different degrees of elevation of pieces of artillery. This instrument has also a brass foot to set upon cannon or mortars, so as when those pieces are horizontal, the whole instrument will be perpendicular.

The use of this level is obvious, and consists in placing the foot thereof on the piece to be elevated; in such manner as that the point of the plummet may fall on the proper degree: this is what they call *levelling* the piece.

The most curious instrument for the use of the artificer, was lately invented by the very ingenious colonel Congreve, of the royal artillery; having the following qualifications *viz.*

1. It will find the inclination of any plane, whether above or below the horizon.
2. By applying it either to the cylinder, or outside of any piece of ordnance, angles of elevation or depression may be given to the 60th part of a degree, with less trouble than the common gunners' quadrant, which only gives to the 4th part of a degree.
3. It will give the line of direction for laying either guns or mortars to an object above or below the horizon.
4. It will find the centre of metals of any piece of ordnance.
5. With it, a point may be found in the rear of a mortar-bed, in the vertical plane of the mortar's axis; consequently a longer line of sight is given for directing them to the object than the usual way.
6. It answers all the purposes of a pair of callipers, with the advantage of knowing (to the 100th part of an inch) diameters, whether concave or convex, without the trouble of laying the claws upon a diagonal scale.
7. On the sides of the instrument are the following lines, *viz.* equal parts, solids, planes, and polygons, logarithms, tangents, versed sines, sines and numbers, plotting scales, and diagonal scale of inches for cutting fuzes by.
8. In the lid of the instrument-case is a pendulum to vibrate half seconds. It is likewise of singular use in surveying; as, 1. It takes horizontal angles to the 60th part of a degree.
2. Vertical angles.
3. Levels.
4. Solves right-angled plane triangles.
5. Oblique-angled plane triangles.
6. Answers all the purposes of a protractor, with the advantage of laying down angles exactly as taken in the field. N. B. Captain Jordane's ingenious instrument answers nearly the same purposes.

*LEVEL, Masons'*, is composed of three rules, so joined as

to form an isosceles triangle, somewhat like a Roman A; at the vertex whereof is fastened a thread, from which hangs a plummet, which passes over a fiducial line marked in the middle of the base, when the thing to which the level is applied is horizontal; but declines from the mark when the thing is lower on one side than the other.

*LEVEL, Balance, for Surveying*, consists of a telescope or ruler with sights, and another ruler fixed perpendicularly to the middle of it, in the form of T, with a weight at the lower end. The whole is suspended by a thread, or upon centres, similar to a scale beam, and the weight of the vertical leg makes the sights or telescope assume the horizontal position. Its advantage is, that it adjusts itself to the level line, which can be transferred to any distant object, by observing it through the sights or telescope. It is necessary to enclose it in a box or case to avoid oscillation from the wind. This instrument is convenient, but not very accurate.

Another balance level, called the "reflecting level," is of French invention, ascribed to M. Cassini. A telescope or ruler, with plain sights, is suspended vertically; a mirror is fixed just before the object glass, being inclined at an angle of  $45^\circ$  with the axis of the telescope. Now as the telescope hangs vertical, and the mirror bends the rays at a right angle, they will of course be horizontal. The telescope must be provided with a diagonal eye-piece, to bend the rays again horizontal, for the convenience of observation. Other modifications of this principle by Messrs. Grandjean and Geulfaens may be found, in the volumes of the *Machines approuvées par l'Académie*. They are to be considered as more ingenious in theory, than applicable to practice.

A balance level, invented by Mr. Richard Drew, is described in the 25th volume of the *Transactions of the Society of Arts*. It consists of a tube, provided with sights at both ends, and suspended from a point considerably above its centre of gravity. It has a sliding weight, adjustable by a screw, to place the tube truly horizontal. This is, perhaps, the best kind of balance level which has appeared.

To the second class of levels belongs the *water level*. This shews the horizontal line by means of a surface of water, or other liquid: founded on this principle, that water always naturally places itself *level*.

The most simple is made of a long wooden trough, or canal, whose sides are parallel to its base; so that being equally filled with water, the surface thereof shews the line of level. This is the *chorobates* of the ancients, described by Vitruvius, lib. viii. cap. 6.

The masons frequently employ this, where they would make the top or courses of a wall truly level: they form the trough by a ridge of mortar or clay stuck round on all sides on the top surface of the wall; and filling the trough, thus formed, with water, they can measure if it is equally deep in all parts.

This sort of level is also made with two cups fitted to the two ends of a pipe three or four feet long, about an inch in diameter; by means of which the water communicates from the one to the other cup; and this pipe being moveable on its stand, by means of a ball and socket, when the two cups become equally full of water, their two surfaces mark the line of level.

This instrument, instead of cups, may also be made with two short cylinders of glass, three or four inches long, fastened to each extreme of the pipe with wax or mastic. Into the pipe is filled some common or coloured water, which shews itself through the cylinders, by means of which the line of level is determined; the height of the water, with respect to the centre of the earth, being always the same in both cylinders.

linders. This level, though very simple, is yet very commodious for levelling small distances:

Another water level is a glass tube, bent into the form of U, having a cup at the top of each leg. This being mounted on a pedestal, and filled with water, or other fluid, it will, from the principles of hydrostatics, stand at the same level in both cups; and by looking through the glass, any distant objects which appear to coincide with the surface of the water, in both cups, will be on the same level with them.

A *reflecting level* is, that made by means of a pretty long surface of water, representing the same object inverted, which we see erect by the eye; so that the point where those two objects appear to meet, is in a level with the place where the surface of water is found. This is the invention of M. Mariotte.

Of a similar nature are the mercurial levels, but they are furnished with two small sights, provided with cross-hairs: these float upon the surfaces of the fluid in the cups, the cross-hairs of each being equally distant from the surface. A line seen through the sights will be parallel thereto, and consequently horizontal. One of these by Alexander Keith, esq. is described and illustrated by drawings in the 2d volume of the Edinburgh Transactions, p. 14, &c. from which we shall here subjoin the following extract. *Fig. 8. (Plate IV. Surveying.)* is a section of the instrument formed of mahogany or boxwood. A, A, are two oblong square cavities connected together by a narrow close channel, running from the bottom of the one to the other. B, B, are two grooves hollowed out of the wood, in order to contain the sights, &c. They are shut up by a lid, which turns upon a screw-nail at the centre C, as may be seen more distinctly from *fig. 11.*

*Fig. 9.* D, D, are the two sights, the one with a small hole, the other with a cross-hair. These sights are erected upon two pieces of ivory or hard wood, which are shaped nearly of the dimensions of the cavities A, A, but so much smaller as to enter without touching or rubbing on the sides. Mercury is poured into the two holes A, A, till they are about half full; the two pieces of ivory which support the sights are put into the cavities, and float on the surface of the mercury.

*Fig. 10.* is a perspective view of the instrument when the sights are floating upon the mercury; and *fig. 11.* is another view of it, when the sights are taken out and the lid is open.

As the two cavities communicate with each other, the surface of the mercury in both is always upon the same line of level; and consequently, if the two sights are once accurately adjusted, they will ever after point out the true level, without requiring any after adjustment.

When this instrument is to be used, it may be laid on any horizontal surface, and the sights will immediately become an exact level. It may also be fixed on a tripod as the spirit-level; or it will answer equally well, if it is affixed to the top of a single stake, which is sharpened at the point so as to be pushed into the ground. If it is to be used as a pocket-instrument, it may be made of seven inches length, being about double the dimensions of the annexed draught. A common walking cane forms a very convenient support. It is affixed to the cane by means of a brass pin E, which passes through the hole G, and through the eye or hole of the walking stick; and a brass nut F, screwing to the male-screw of the brass pin, keeps them firm together. The two grooves B, B, contain the two sights and brass pin, when not in use. Two corks, covered

with thin leather, fitted into the holes A, A, confine the mercury, when the instrument is to be transported; or, in case the mercury is found to escape, it may be poured into a small case, made of lignum vitæ, like a tooth-pick case; and this may be stopped with a cork, and made to fit into one of the grooves.

The advantages of this instrument over the spirit-level are: 1st, It requires no adjustment, consequently two observers, though otherwise not equally accurate, must make the same observation. 2dly, With this, the level of twenty different places may be taken during the time required to adjust the spirit-level for one observation. 3dly, The nicety of the spirit-level depends upon the small curve of the glass-tube, in the choice of which no rule can be laid down; neither is any thing gained, in point of exactness, by lengthening the spirit-tube above three or four inches. But every instrument of this kind is of one standard; and the further the two sights are removed from one another, the more any error is diminished. 4thly, This instrument can be made perfectly just, without taking any observation, or comparing it with another level. In order to do this, let the floats on which the sights rest, be of the same dimension and weight, and let the cross-hair and eye-hole be of one height, and without farther adjustment, they will point out the true level.

To the third class of levels belongs the *spirit level*, called also the "*air level*," which is more accurate than any other kind, and is most extensively used. The invention of this instrument has been ascribed to M. Thevenot. Others have attributed this application of a bubble of air to Dr. Hooke. The instrument consists of a cylindrical glass tube filled with spirits of wine, except leaving in it a small bubble of air: its ends are hermetically sealed to keep in the fluid. This bubble, being the lightest of the contents of the tube, will, by the laws of hydrostatics, always run towards that end of the tube which is most elevated; but when the tube is perfectly horizontal, the bubble will have no tendency towards either end. The tube is not strictly cylindrical within, though it bears that appearance; it is slightly curved, the convex side being upwards, and by this means the bubble will rest in the middle of the tube when it is horizontal, but approaches either end which is elevated above the other. The simplest form of a spirit level for fixing any plane truly horizontal, consists of a glass tube of the above description, called a bubble tube, fixed into a block of wood, as at A B, *fig. 1. of Plate V. Surveying.* The lower surface D E of the block is made flat; and when the bubble C stands between two scratches marked on the glass at *a b*, the line D E is horizontal. The method of making it correct is this; the tube is first fitted into the block, the lower edge, D E, of which is placed on a bench or table as nearly horizontal as can be determined, so that the bubble stands between the scratches *a, b*. The level is now reversed, that is, the end D is put where E was at first. In this position, if the bubble stands in the middle, it proves the level to be correct, and the table horizontal; but if it runs to either end of the tube, it shews that end to be too much elevated: suppose it B, for instance; this end of the tube must therefore be let deeper into the wood, or the surface D E rectified to produce the same effect: one-half the error must be compensated by this means, and the other half by rectifying the table or support; for D E, the level, must now be reversed again to verify these corrections; and when they are so made that the bubble stands at *a b*, either way, the level is correct.

To illustrate this more plainly, see *fig. 2*, which represents a section of a bubble tube; but, for elucidation, is shewn as

if curved much more than they are ever made. Suppose the convex or upper surface of the tube to be a segment of a large circle B C D, from the laws of hydraulics it is plain, that the bubble of air, being the lightest body in the tube, will certainly occupy the highest point of the circle at C; and the two points B, D, being equally distant therefrom, will be in the same horizontal line B E D. The larger the radius of the circle D B, so will the level be the more sensible of any deviation from the horizontal, because the bubble will have to traverse a greater distance along the tube, in proportion to any partial elevation of either end. The numerous spirit levels applied to the delicate astronomical instruments made by Mr. Troughton, and described in our articles CIRCLE, EQUATORIAL, TRANSIT, &c. are, in general, formed by grinding the inside of the tube to a circle of near 400 feet radius. In a level of this kind, the elevation of one minute of a degree, of the line B E D, will produce a motion of three inches of the bubble; therefore a second will be 1-20th of an inch, and may be determined to the greatest precision. For common purposes, the bubble tubes have a much more rapid curvature, and are proportionably less sensible, which is very proper, because the bubbles of such delicate levels can never, in common use, be brought to stand at all steady, from the bending of the floors, and tremors of the supports they are applied to. The application of the bubble tube has been shewn in numerous instances in the articles above-mentioned; but the instrument denominated the spirit-level, for surveying, remains to be described here. The most simple form is a ruler of brass, having a bubble tube fixed down upon the middle of it; at each end of the ruler a sight is erected, through which the observer views any distant object, whose level is to be ascertained. This instrument is fitted upon a support with three legs, and has a ball and socket, by which the ruler and sights can be turned about in all directions, until the bubble shews it to be horizontal. The instrument in this form, which is the original, is so extremely inconvenient for use, that it is totally unfit for the delicate observations necessary for setting out canals, and other works, where the conveyance of water is concerned, and is therefore but very little used, except in levelling for roads, where an error is of slight importance. After having described some progressive improvements in this instrument, we shall proceed to the description of the level with telescopic sights, which is universally employed for the above purposes.

The *air-level*, with sights, is an improvement of the simple *air-level* already described; which, by the addition of more apparatus, becomes more commodious and exact.

It consists of an air-level (Plate VI. *Surveying*, fig. 1.) about eight inches long, and seven or eight inches in diameter, set in a brass tube, with an aperture in the middle. The tubes are carried in a strong, straight ruler, a foot long, at whose ends are fixed two sights, exactly perpendicular to the tubes, and of an equal height, having a square hole, formed by two fillets of brass, crossing each other at right angles; in the middle whereof is drilled a very little hole, through which a point on a level with the instrument is described. The brass tube is fastened on the ruler by means of two screws; one whereof, marked 4, serves to raise or depress the tube at pleasure, for bringing it towards the level. The top of the ball and socket is rivetted to a little ruler that springs; one end whereof is fastened with screws to the great ruler, and the other end has a screw 5, serving to raise and depress the instrument, when nearly level.

This instrument is yet less commodious than the following one, because, though the holes be ever so small, yet

they will still take in too great a space to determine the point of level precisely.

*LEVEL, Air, with telescopic sights.* This level, represented in Plate VI. *Surveying*, fig. 2, is like the last; with this difference, that, instead of plain sights, it carries a telescope, to determine exactly a point of level at a good distance.

The telescope is in a little brass tube, about fifteen inches long, fastened on the same rule as the level. At the end of the tube of the telescope marked 1, enters the little tube 1, carrying the eye-glass and a hair horizontally placed in the focus of the object-glass 2; which little tube may be drawn out, or pushed into the great one, for adjusting the telescope to different sights. At the other end of the telescope is placed the object-glass; the screw 3 is for raising or lowering the little fork carrying the hair, and making it agree with the bubble of air when the instrument is level; and the screw 4 is for making the bubble of air agree with the telescope. The whole is fitted to a ball and socket.

M. Huygens is said to have been the inventor of this level; which has this advantage, that it may be inverted, by turning the ruler and telescope half round; and if then, the hair cut the same point that it did before the turn, it is a proof the operation is just.

It may be observed, that one may add a telescope to any kind of level, by applying it upon, or parallel to, the base, or ruler, when there is occasion to take the level of remote objects.

For the method of adapting a level to the meridian telescope, see TELESCOPE.

Mr. Hadley has contrived a spirit-level to be fixed to a quadrant for taking a meridional altitude at sea, when the horizon is not visible. See the description and figure of it in the Phil. Trans. N° 430, p. 167, &c. or Martyn's Abridge, vol. viii. p. 358, &c. See also the method of preparing and using a water level, and a mercurial level, annexed to Davis's quadrant, for the same purpose, by Mr. Leigh, in Phil. Trans. N° 451. p. 413, or Abr. vol. viii. p. 360, &c.

*LEVEL of M. Huygens's Invention* consists of a telescope, *a*, (Plate VI. *Surveying*, fig. 3.) in form of a cylinder; going through a ferril, in which it is fastened by the middle. This ferril has two flat branches, *b b*, one above and the other below; at the ends of which are fastened little moving pieces, which carry two rings, by one of which the telescope is suspended to a hook at the end of the screw 3; and by the other, a pretty heavy weight is suspended in order to keep the telescope in equilibrio. This weight hangs in the box 5, which is almost filled with linseed oil, oil of walnuts, or other matter that will not easily coagulate, for more aptly setting the balance of the weight and telescope. The instrument carries two telescopes, close and very parallel to each other, the eye-glass of the one being against the object-glass of the other, that one may see each way without turning the level. In the focus of the object-glass of each telescope, must a little hair be framed horizontally, to be raised or lowered as occasion requires, by a little screw. If the tube of the telescope be not found level when suspended, a ferril or ring, 4, is put on it, and is to be slid along till it fixes to a level. The hook on which the instrument is hung, is fixed to a flat wooden cross; at the ends of each arm of which there is a book, serving to keep the telescope from too much agitation in using, or in carriage. To the said flat cross is applied another hollow cross, that serves as a case for the instrument; but the two ends are left open, that the telescope may be secured from the weather,

ther, and always in a condition to use. The foot of this instrument is a round brass plate, to which are fastened three brass ferrils, moveable by means of joints, wherein are put flaves: and on this foot is placed the box.

In the portable *spirit-level*, the tube is properly set in brass, and fixed by means of screws in a small brass trough, the bottom of which is ground very straight. The ferrils are useful to place the bubble in such a position that the lower surface of the trough may be parallel to a tangent supposed to be applied to the middle point of the curve of the level. The adjustment is effected without much difficulty, by placing the level on an adjustable plane, and then reversing it. If the bubble stand accurately in the same position between two marks made on the tube in both situations of the level, it follows, that neither end of the plane nor of the lower surface of the frame of the level is elevated; or, in other words, that every surface to which the level may be applied, and on which the bubble stands in the position here mentioned, is horizontal.

This easy praxis may be effected in various ways, according to the nature and figure of the instrument of which the position is to be determined; but the accuracy of the result will depend upon the sensibility of the level; that is to say, the space passed over by the bubble for every minute or second of the quadrant, and the certainty with which, under circumstances precisely similar, it shall arrive at the same position. In the best levels the curve must be circular; for in such the bubble will move with more activity, settle itself with more certainty, and describe equal spaces by equal changes of inclination. An ordinary good spirit-level will exhibit a movement of upwards of half an inch for each minute of inclination, and alter the position of its bubble by a change of five seconds, or less. In such a tube the radius of the curve will be about 150 feet. But extraordinary levels are much more delicate. De Lalande speaks of a level filled with ether, the bubble of which passed over fourteen inches by equal spaces of one-tenth of an inch for every second. The radius of this curve was consequently 1719 feet; or near one-third of a mile.

The tubes of spirit-levels are selected by trial. If a long piece of tube be nearly filled with ardent spirit, and corked at the ends, the run of the bubble may be tried with a suitable instrument called the level-trier, throughout the whole length on all sides. By this means it may be known whether, and in what parts, it may be desirable to divide the tube for the purposes of filling and closing. It is remarkable that these tubes in general prove either good throughout, or good for nothing; for it seldom happens, where one good level can be taken, that the remainder is unserviceable. A respectable mathematical instrument-maker assures us, that he finds it a good practice to go to the glass-house and cause the tubes to be drawn without suffering them to be turned round.

But the most regular and accurate levels are obtained by grinding the inside of the tube. For this purpose, a cylindrical piece of wood is turned so as to go easily through the portion of tube intended to be ground. It is then worked in the tube with water and fine emery in the usual way. As soon as the polish has by this means disappeared on one side, the tube is cleaned, filled, and tried; and accordingly as its figure proves to be more or less straight or curved, the grinding is either repeated or discontinued. Some operators polish the inside again after grinding; but this has not been found to increase their sensibility.

From the great delicacy of the spirit-level, compared with the few observations here presented on the plumb-line,

the former instrument may appear greatly to deserve the preference. Astronomers are not however agreed on this point. When a spirit-level is adjusted by reversing, at a certain temperature, and both ends of the bubble marked, it may be allowed that the instrument may be successfully applied to use. But if the temperature be raised, the spirit will expand, and of course the bubble will become shorter. Whence it appears necessary that a division and adjusting piece should be applied, from experiment, to ascertain the true station of the bubble at different temperatures; and even this application seems scarcely adequate to supply the place of repeated adjustments. The variation of the bubble will differ according to the quantity of spirit contained in the tube. In two good levels, of nearly the same magnitude and figure, we found it amount to one-fifth of an inch for every ten degrees of Fahrenheit. The bubble therefore may be one inch longer in winter than in summer, which in these individual levels amounts to near one-third of the summer length. The curvature of a spirit-level will also vary from unequal temperature; such, for example, as may arise from one end of the tube being touched or breathed upon, while the other end is left at the original temperature. The error from each of these causes may amount to several minutes, as is easily shewn by trial; but we do not find that the presence or absence of sunshine causes any perceptible difference. It is probable that the rays may not speedily alter the temperature, on account of the transparency. And with regard to these three last sources of error, it must be allowed that they are easy to be avoided, and indeed not likely to be present in the operations of accurate observers.

We have, in *Plate V. Surveying*, given figures of two levels by the most celebrated makers, the late Mr. Jesse Ramsden, and another by Mr. Troughton: of the former, A B, *fig. 3*, is the telescope, having the spirit-level C D fitted in a brass tube, fixed beneath it. The telescope is supported at its ends by resting on angular notches in two pieces of brass, Y 1, Y 2, called the *wyes*, from their resemblance to that letter. It is held in the angles of the wyes by a clip r r, shutting down over each and pinned fast. The wyes are supported on a brass bar E E, the middle of which has a large circular aperture in it, to receive a compass needle. A bottom plate a a, being screwed under this aperture in the bar, and a glass cover fitted over it, forms the compass-box F, in which the magnetic needle turns round. The bottom a a of the compass-box has a long axis fastened to it, which is fitted into the dome of the circular plate G, and also passes through a spherical ball, shewn by the dotted lines to be screwed fast to the underside of the dome of the plate. Upon this axis, the telescope-level and compass-box turn round horizontally; the ball, just mentioned, is received in a corresponding cavity in the socket R, which is part of the plate H. By this ball and socket the two plates G and H are united, but not confined to be parallel, though they are called the parallel plates. Four screws (two of which are seen at I K) pass through the plate H, and their heads support the plate G, which can, by means of them, be placed horizontal, (and consequently the axis fixed in it vertical,) though the lower plate is not horizontal, which will depend upon accident, as it is supported on three legs set on the ground, and may therefore partake of its inclination. The legs are not shewn in *fig. 1*, but are the same as those seen in *fig. 3*, at L M N: they are all jointed into the same piece of brass O, which has a large screw on the top of it, entering a female screw in the interior of the projecting part R, *fig. 3*, of the plate H. When

## L E V E L.

flut up, the three legs form one round flaff, and are secured for carriage by rings put on them: when opened out, they make a very firm stand on the ground, though it be ever so uneven. These being the chief parts of the instrument, we have only to notice the contrivances for adjusting every part to perform accurately. The mill-headed nut *d*, at the top of the telescope, being turned, thrusts forth a tube *e*, contained within the external tube of the telescope, and carrying the object glass, which is by this means adjusted to its focal distance, so as to see an object distinctly at any distance. The telescope has two wires in the eye-end at *f*/*g* crossing each other perpendicularly: it is by intersecting these the object is viewed. The eye-piece, *L*, of the telescope slides in its tube to adjust the focal distance of the eye-glasses. That these wires may be seen distinctly, the level is suspended from the telescope at one end by a screw *D*, which adjusts it parallel to the axis or line of sight of the telescope. At the opposite end *C* is another screw adjustment, to make it parallel in the direction sideways, that is, in the same vertical plane with the axis of the telescope. The *Y* 2 is supported in a socket *M*, and can be raised or lowered by the screw *N*, to make the level and telescope truly perpendicular to the vertical axis represented by the dotted lines. The screw *O* is for turning the axis about to direct the telescope to any object: it operates upon a ring or clump of brads *P*, which encloses, and is fixed to, the axis when the screw *S* is turned, but when this screw is slack, the clump releases the axis, that the telescope may be turned round readily, to bring the desired object into the field of view: then by screwing *S* the telescope is made fast, but may still be turned a small quantity by the screw *O* to direct it exactly to the object.

The compass contained in the bar *E E* is for taking bearings of any object; but as its use is not connected with the operations of levelling, and has been fully described under the article CIRCUMFERENTOR, we refer to that article.

Previous to taking any levels by this instrument, the adjustments should all be verified by the observer; for though they are ever so accurately done by the maker, they are not to be depended upon after the instrument has been carried about, or used; and for this reason they are all so contrived, as to be done with care in the open air. The process is as follows: open the three legs, and set them firmly upon the ground, placing the parallel plates *G* and *H* as nearly horizontal as can be guessed.

1<sup>st</sup>. *Adjust the level C D to be parallel to the telescope* in the following manner: Open the clips *r*, *r*, which confine the telescope in the wyes, and turn the screw *N* till the bubble comes into the middle, as is shewn by two scratches on the glass tube. Now lift the telescope gently out of the wyes, and reverse or turn it end for end, and if the bubble stands where it did before, all is right; if it goes to either end, observe how much it is from the centre, and by turning the screw *N* depress the end towards which the bubble runs, (or, what has the same effect, elevate the other end,) until the bubble returns one-half the quantity of its error. Now by the screw *D* alter the level the other half the error; if these halves were correctly estimated, it will be right, as is proved by the bubble standing right on returning the telescope to its original position. If not right now, the adjustment must be repeated till the bubble stands right either way, which proves the level and the telescope to be exactly parallel; the two cylindrical parts of the telescope, where the wyes receive it, being made precisely the same diameter.

2<sup>dly</sup>. *To make the cross-wires in the telescope intersect each other in the axis or line of collimation thereof.*—The eye-piece *L* being drawn out to see the wires distinctly, direct the telescope to any distant object, and by the nut *d* adjust the focal distance to see it clearly: select some straight line in the distant object, as the side of a window, &c. Then by the screws *N* or *O*, one elevating the telescope, the other moving it sideways, and by turning the telescope in its wyes, bring one of the cross-wires to coincide with the straight line of the distant object, without regarding the level. Now turn the telescope half round on its own axis, as it lies in the wyes; and if the cross-wire is truly in the axis it will not appear to have changed its position; but if it has, the wire must be moved, by turning an opposite hair of the four screws at *f*/*g*: by these move the wire across the field of view one-half of the error, and by the screws *N* or *O* turn the telescope back the other half. The other wire is now done in the same manner, by observing its coincidence with a distant object, and then turning the telescope half round on its own axis; and both wires may be proved by observing a small object, as a circular chalk mark, &c., to be in the intersection of both wires; and turning the tube round on its axis, it will, if right, appear in the intersection in all positions. The instrument is now prepared for taking levels in the manner explained under LEVELLING; and, if carefully used, need not be re-adjusted for many days.

The level above described, is that which is in the most general use, great numbers having been made by Mr. Ramsden, and since his decease by his numerous pupils. It is certainly an excellent instrument in the hands of those who are ready and expert in the manipulation of the adjustments just described, and who are careful to repeat them when necessary.

The instrument delineated in *fig. 4*. has lately been brought forwards by Mr Edward Troughton. Its construction is so compact, that the parts are little liable to derangement, and therefore do not need so many provisions for adjusting, by which the instrument is simplified and rendered more portable. *A B* is the telescope, and *D E* the level; its brads tube being partly received into the telescope, and soldered fast thereto, so as to be in no danger of altering its position: the telescope is screwed to a strong brads bar *F F*, which screws fast to the top of a conical socket *G*, that turns upon a vertical axis fastened to the plate *H*: this is united to the lower plate *I* by a ball and socket, and the four screws screwing through the upper plate, and resting on the lower, give the means of always setting the axis vertical: the joints *O* for the three legs *L, M, N*, are fixed to the lower side of the plate *H*: the compass-box *P* is supported over the level by four small pillars; by this means it is more readily observed than when beneath, and gives the means of laying the telescope so close to the brads bar *F*, that it is much more firm than the former instrument. The bubble of the level is so long, that its ends appear on both sides of the compass-box, and is shewn to be in the middle by scratches on the glass at *a b*, as usual.

The screws which hold the telescope to the plate *F* are covered by caps of brads, which defend them from accidental alteration, but admit their adjustment when necessary. To make the telescope exactly perpendicular to the vertical axis, the only adjustment the instrument requires besides this is the eye-piece. It has, in lieu of cross-wires, a small micrometer or divided scale, of mother-of-pearl, fixed perpendicularly across the field of view, the divided edge intersecting the line of collimation: the central division of the

## L E V E L.

scale has a small hole through it for distinction. It is this by which the levels of objects are observed, and it therefore crosses the axis of the telescope. It can be adjusted exactly to this by a screw *d* at top, and another *e* beneath the tube.

The manner of adjusting this instrument is as follows: the legs being set on firm ground, the vertical axis is adjusted, in the same manner as every other level is preparatory to making observations, *viz.* by setting the telescope over any opposite two of the four screws in the parallel plates, and turning these screws, one in and the other out, till the bubble comes right; then turn it half round, by applying the finger and thumb to the large milled nut on the top of the socket *G*. If it is level when thus reversed, all is right; if not, it shows the level is not perpendicular to the axis, and one-half the error must be corrected by the screws under the ends of *F*, and the other half by the screws of the parallel plates, the telescope being turned over the other pair of screws; and they are adjusted in the same manner. Now the axis is vertical, as is shown by the bubble standing still while the telescope is turned all round. The plate *F*, being once adjusted in this manner, will not soon be deranged, and when it is will immediately discover itself, and be as easily restored. The line of light, or line of collimation of the telescope, is made parallel to the level, by an actual trial in the field, which indeed is the most accurate method, and is resorted to for very delicate purposes. In the instrument before described, to verify the adjustments after making them, the method of trial is applicable to a level of any kind, and is described under LEVELLING. The micrometer scale in the eye-piece is very useful in levelling; it gives the means of roughly estimating equal distances from the instrument in any direction. A man who attends the observer holds up a staff of six feet, or any other length, perpendicular, and the observer, looking at it through the telescope, notices how many divisions of the micrometer scale the staff appears to subtend; then, if the man recedes from the instrument until the same staff reaches the same number of divisions, he will be at the same distance from the instrument. This property is extremely convenient in many instances which occur in the use of a level.

LEVEL, *American*, is an instrument which is formed of two pieces of thin wood of equal length, joined together at top, and connected below by a cross bar; from the angle at top a lead plummet is suspended by a small cord, which, when the instrument stands level on both legs, strikes upon a mark in the centre of the connecting bar, as represented by *a*, *fig. 4.* in *Plate VI. Surveying.* The manner of using it is simply this: At the place from which the level is to be taken, drive a wooden peg in the ground, close in to the top, upon which one of the legs of the frame may rest; then bringing round the other leg till it touch the ground, then drive in a second peg, turning round the other leg as before; and where it touches the ground again, drive in another peg, and so on along the whole line to be levelled. Thus, with very little trouble, and with as much accuracy as with the finest spirit-level, will the course of the drain be easily ascertained. But as it is necessary the drain should have as much declivity as to allow the water to run freely, it will be requisite, in taking the level, to regulate the direction of the line accordingly. Half an inch fall in the length of the frame will be sufficient, and sometimes even less. For this purpose, it will be expedient to have, besides a number of wooden pegs, one iron pin, with inches and halves marked regularly upon the sides of it from the top downwards. After having drove in the first wooden peg at the point from whence you mean to conduct the drain, and

having rested the one leg of the frame upon it, turn round the other till it be level with the first peg; there put in the iron pin, so that this leg of the frame may rest on the top of it when level; then drive in a wooden peg so far, as that the top of it may be half an inch lower than that of the iron pin. Place the leg of the frame again upon this second peg, turn it round to a level, putting in the iron pin till the top of it be equal with the foot of the frame; then drive in another wooden peg close by the side of it, till the top of the wooden one be half an inch lower than that of the iron pin. Proceed in this manner so far as you mean to carry the drain, which will have the same degree of declivity all the way along. A line thus set off is marked from *c* to *d* in the figure. When made on a smaller scale, it is useful in ascertaining the proper descent along the bottom of a drain, while the workmen are laying it; but when made for this purpose, the cross bar must be fixed to the bottom of the legs, as marked with dotted lines in the plate.

There is a watering level which is much used in some places, which is formed of different pieces of wood, &c.; the usual length given it being five feet and a half, and the height from four feet to four feet and a half, according to the height of the person who is to make use of it.

The *object staff*, *fig. 5, Plate VI. Surveying*, should be made exactly of the same height with the level. The cross piece, *fig. 6*, should be sufficiently large to be seen distinctly at a distance, and must be painted white for the purpose.

This level, in the experience of Mr. Marshall, has been found "preferable to any other level now in use, as being equally accurate in ascertaining the relative heights of distant objects, as in minutely tracing step by step the required line of communication, so as to give every part of it an equal and uniform descent." In its use in setting out a level, so as to fix the fall accurately at one inch, foot, or yard, in a hundred of any of them, on the face of the level, which is found in general to be the most proper; it is directed to measure out one hundred feet on level ground, placing the level at one end, the object-staff at the other, and then adjusting their tops to a dead level, by a dead level line exactly drawn on the face of the implement (*viz.* a line drawn at right angles with the upper edge of the top rail), as shewn at *a*, in the figure, then measuring one foot downward on the staff, and there holding a rule or other straight edge level across the staff; bringing the top of the level, by raising its hinder foot, to range accurately with the upper side of the rule, and while they remain at rest in this position, a mark must be made where the plummet-line rests against the face of the level. After this measure out a hundred yards, and proceed in the same manner, in order to prove or rectify the first mark, on which a permanent line must be sunk on the face of the level *b*, in the figure, which in water-work is better than the plumb-line. Where the ground to which the water is to be conducted can be seen from the place whence it is to be taken, the staff should be set upon the highest part to which it is desirable to raise the water, and the level at the source, and after having correctly adjusted the top of the latter to that of the former mark, where the plummet rests on the face of the level, where it rests between *a* and *b*, it is necessary to consider the case, as, where the extent of land is small, and that of the water unlimbed, little fall may be sufficient; but in the contrary circumstances, it would be improper to let it waste by the way more than is necessary; of course where the plummet rests much within the water-line, the staff must be moved and set lower down on the slope till the requisite fall is gained. But where the plummet is found to rest on the

right-

right-hand side of the water-line, mark the plan and draw a pencil line, (which will be sufficiently durable for a single work, and may afterwards be easily rubbed out on the face of the level,) corresponding to the line of the plummet, as the dotted line *c*, and thus fix the fall in this case, always making due allowance, in tracing and staking out the line with the level thus set, for the crookedness of the course; as from this lengthening the line, the declination of the channel is proportionally lessened.

It is supposed further, that "many ingenious additions" might be made to this level; but that "they would be injurious to its present simplicity;" Any country carpenter may be easily instructed to construct it in its present form, and "any common labourer be easily taught to use it, either in forming roads or water-courses." It is, however, best adapted to the latter use.

Dr. Defaguliers contrived an instrument, by which the difference of level of two places, which could not be taken in less than four or five days with the best telescope levels, may be taken in as few hours. The instrument is as follows:

To the ball C (*Plate VI. Surveying, fig. 7.*) is joined a recurved tube B A, of a very fine bore, with a small bubble at the top A, whose upper part is open. From the construction of this instrument, it is evident, that if it be inclined in carrying, no prejudice will be done to the liquor, which will always be right both in the ball and the tube, when the instrument is set upright. If the air at C be so expanded by heat, as to drive the liquor to the top of the tube, the cavity A will receive the liquor, which will come down again, and settle at D, or near it, according to the level of the place where the instrument is, as soon as the air at C returns to the same temperament as to heat and cold. For preserving the same degree of heat, when the different observations are made, the machine is fixed in a tin-vessel, E F, filled with water up to *g h*, above the ball, and a very sensible thermometer has also its ball under water, that one may observe the liquor at D, in each experiment, when the liquor in the thermometer stands at the same height as before. The water is poured out when the instrument is carried, which may be done conveniently by means of the wooden frame (*fig. 8.*), which is set upright by three screws, S, S, S, and a line and plummet P P (*fig. 9.*) At the back part of the wooden frame (*fig. 10.*) from the piece at top, K, hangs the plummet P, over the brass point at N. M, m, are brackets for keeping the upright board, K N, at right angles with the horizontal one at N. The machine seen in front is represented *fig. 11.* supposing the fore-part of the tin vessel transparent; and here the brass socket of the recurved tube, into which the ball is screwed, has two wings at I I, fixed to the bottom, that the ball may not break the tube by its endeavour to emerge, when the water is poured in as high as *g h*.

After Dr. Defaguliers had contrived this machine, he considered, that as the tube is of a very small bore, if the liquor should rise into the ball A (*fig. 7.*) in carrying the instrument from one place to another, some of it would adhere to the sides of the ball A, and upon its descent in making the experiment, so much might be left behind, that the liquor would not be high enough at D to shew the difference of the level; therefore, to prevent that inconvenience, he contrived a blank screw, to shut up the hole at A, as soon as one experiment is made, that in carrying the machine, the air in A may balance that in C, so that the liquor shall not run up and down the tube, whatever degree of heat and cold may act upon the instrument, in going

from one place to another. Now because one experiment may be made in the morning, and the water may be so cold, that when a second experiment is made at noon, the water cannot be brought to the same degree of cold it had in the morning; therefore, in making the first experiment, warm water must be mixed with the cold, and when the water has stood some time before it comes to be as cold as it is likely to be at the warmest part of that day, observe and set down the degree of the thermometer at which the spirit stands, and likewise the degree of the water in the barometer at D; then screw on the cap at A, pour out the water, and carry the instrument to the place whose level you would know; then pour in your water, and when the thermometer is come to the same degree as before, open the screw at top, and observe the liquor in the barometer.

The doctor's scale for the barometer is ten inches long, and divided into tenths; so that such an instrument will serve for any heights not exceeding ten feet, each tenth of an inch answering to a foot in height.

The doctor made no allowance for the decrease of density in the air, because he did not propose this machine for measuring mountains (though with a proper allowance for the decreasing density of the air, it will do very well,) but for heights to be known in gardens, plantations, and the conveyance of water; where an experiment that answers to two or three feet in a distance of twenty miles, will render this a very useful instrument. Defaguliers's Exp. Phil. vol. ii. p. 372, &c.

LEVEL is a term used to denote a length or pound of a canal, and also the adit or fough to a mine or engine-pit.

LEVEL-piſs, are small flakes used in levelling out an intended canal; and they are usually placed at the level of the top bank, as at *d*, *Plate I. Canals, fig. 7* and *8*.

LEVELLING, the art or act of finding a line parallel to the horizon, at one or more stations, in order to determine the height of one place with respect to another; for the laying grounds even, regulating descents, draining morasses, conducting waters, for the irrigation of land, &c.

The first process, preparatory to taking any levels, is to prove the correctness of the instrument you employ for that purpose. Some instruments are contrived to prove themselves, as described in LEVEL; but others require an actual trial in the field, which is a general method, and applicable to a level of any kind. If the level is made with plain sights, the proof is very simple: first set it level, and observe some distant object; then turn the level, end for end, and observe the same object through the other sight. If it is the same both ways, all is right; if not, the level must be altered one-half of the error thus discovered, which is doubled by this method of trial. For instance, if the line of sight pointed down the first time, it will point as much upwards when used at the other end. A level with a telescope cannot be used at either end, and therefore this method is inadmissible, and the following may be adopted.

Choose a spot of ground where it is tolerably level for about twenty chains; set up the instrument at the point B, *fig. 1. Plate VII. Surveying,* and, levelling the telescope by the parallel plates, that the bubble will stand while it is turned all round, direct the telescope to a target held up by an assistant, upon a stake driven in the ground at D, at 20 chains distant. Your assistant must, according to your signals, elevate or depress the vane of the target, till it appears in the intersection of the cross wires; now measure and write down the height B *b* of the centre of the telescope above a stake driven into the ground at B, suppose it four feet; and also write down the height D *d* at which the vane of the target

## LEVELLING.

get stands, which suppose six feet; the difference between them, two feet, shews that B is two feet higher than D; but the line *b d*, being a tangent to the earth's surface at the point B, will be the apparent level; and the true level will be found, by deducting the allowance for 20 chains, shewn by the table of the earth's curvature to be .041 of a foot. Making, therefore, the true difference of level between B and D to be 1 959 feet, to prove this, level it the other way, removing the instrument to D, and the target to the stake at B. Observe in the same manner as before, and if it gives the same difference of level as before, after deducting the allowance, the instrument is correct; if, on the other hand, the results by the two methods do not prove the same, take half the difference between the two, and elevate or depress the target that quantity, according as the last observation was greater or less than the first, and adjust the instrument, either by the screw under the level, or the screws of the cross wires, until they appear to cut the vane of the target so corrected, when the bubble is in the middle. The instrument is now corrected, but the trial should be repeated to make it certain.

The following method of adjusting a spirit-level is rather preferable, as it does not require the instrument to be removed; but it is only applicable to those instruments where the telescope lies in wyes, and can be removed. Set up the level, as at A in *fig. 2*, so that you can see both ways for about 100 yards; fix up a staff in each direction at B and C, 100 yards distant, so that the two staves and the telescope are in a line. Now give your assistant two circular pieces of card, about twice the diameter of the telescope where it lies in the wyes, with a hole through the centre of each, large enough to receive the tube of the eye-piece of the telescope; now level the telescope, and your assistant applies one of the cards against one of the staves, B for instance, and moves it up and down, till its centre appears to the observer to intersect the wires. The assistant now fastens it to the staff at *a*, by two pins, but so that the centre hole can be seen clear through by the side of the staff. The telescope is now turned half round, and directed to the other staff C, which is fitted with a card at *b*, the same as the former. This being done without disturbing the instrument, take the telescope out of its wyes, and shut down the clips again; carry the telescope to one of the staves B, and applying its eye-piece to the hole in the centre of the card at *a*, direct the telescope to the wyes of the level, and, looking through them, if the card *b* on the distant staff C appears to sit in the wyes, the level is proved correct; if it does not, mark the place where the card *a* is fixed to the staff B, unpin it, and slide it up or down, till the distant card appears to fit in the wyes. Mark this position of the card, *viz.* at *d*, and pin it on in its first position; repeat this operation at the staff C, and the card *b* will be removed to E. The figure explains the principle of this process: in the first operation the telescope set out the inclined line A *a*, instead of a horizontal line; the next operation was observing the inclined line A *b*; the third operation at the staff B formed a continuation of the inclined line B A to *d*; and the fourth operation continued A A as far as *e*. In this state it is evident, if the spaces *a, d, b, c*, each of which are double the error of the instrument, are divided into two equal parts at the points *f, g*, that the line *f A g* will be truly horizontal, and the instrument may be adjusted by the screws under the level, so as to point to *f* or *g* when the bubble is in the middle.

One place is said to be higher than another, or *out of level* with it, when it is more remote from the centre of the earth; and a line equally distant from the centre of it in

all its points, is called the *line of true level*: whence, because the earth is round, that line must be a curve, and make a part of the earth's circumference, or an arc concentrical with it, as the line B C F G, *Plate VII. Surveying, fig. 3*, all the points whereof are equally distant from the centre of the earth A.

But the line of sight, which the operations of levels give, is a tangent, or a right line perpendicular to the semi-diameter of the earth; one extreme of which tangent being the point of contact, the other will be that of a secant drawn from the centre of the earth; and the point which determines it, will be above the surface of the earth, and of the true level, as much as that secant exceeds the radius, or semi-diameter of the earth.

This extremity of the tangent is said to be in the apparent level, as being that given by the sight; but is easily reduced to the true level, because we know by trigonometry, how much each secant exceeds the radius; and because by measuring, we have discovered the precise length of that radius. Or, since the apparent level between the places B and C is B D, and the true level is the arc B C; it is plain that the former rises above the latter by the line C D. But by a well known property of the circle  $2 AC + CD \times CD = B D^2$ , and the diameter of the earth being so great with respect to the line C D at all distances to which the operation of levelling commonly extends, that  $2 AC$  may be safely taken for  $2 AC + CD$  without any sensible error, we shall have

$2 AC \times CD = B D^2$ , and  $CD = \frac{B D^2}{2 AC}$ ; *i. e.* the difference between the true and apparent level is equal to the square of the distance between the places divided by the diameter of the earth, or the rise of the apparent above the true level is proportional to the square of the distance. It was for want of the knowledge of this, that the ancients were not able to reduce the apparent level to the true one; and accordingly, to prevent falling into an error, never levelled above twenty feet at once, where such reduction was not necessary.

By the table since made, it appears, that at the distance of 100 yards the apparent level is raised above the true one about one-third of a line; so that the ancients, in this respect, were more scrupulous than needful. By means of this reduction, we are now able to level distances of one or two miles at a single operation, which the ancients could not do in less than three hundred.

The following table, for shewing the height of the apparent level above the true, was calculated by Mr. Ferguson, to the extent of a whole degree of a great circle on the earth's surface, and it agrees so nearly with one of the same sort in Dr. Long's Astronomy, as not to differ quite two inches from it at the end of the whole degree, which contains 60 geographical miles, equal to  $69\frac{1}{2}$  English miles. The use of this table is as follows: If the quantity of an arc of a great circle on the earth's surface is given in minutes or seconds of a degree, its measure may be found in feet and inches. Thus, suppose the arc contains ten seconds, which is the sixth part of a geographical mile, its measure is 101 5 feet 8 inches. So an arc of one minute of a degree, which is one geographical mile, contains 6094 feet, or 2031 yards 1 foot; which is 271 yards 1 foot longer than an English mile. To find how far one can see in a true horizon (as at sea) when the eye is raised to any given height above the horizon: suppose the eye of an observer upon a ship at sea to be 23 feet two inches above the surface of the water, he will then see 30,470 feet all around him, or to the distance of 5 geographical miles.

Suppose.

## LEVELLING.

Suppose the top of a mountain in the sea to be seen at the distance of 60 geographical miles, or one degree, by an observer, whose eye is close at the surface of the sea; the height of that mountain is 3191 feet 1 inch, nearly, above the surface of the sea. An English mile is 5280 feet, a geographical mile 6094.

Suppose a spring to be on one side of a hill, and an house on an opposite hill, with a valley between them; and that the spring seen from the house appears, by a levelling instrument, to be on a level with the foundation of the house, and is a mile from it; the apparent level of the spring is 10 $\frac{1}{2}$  inches above the true level of the house: and this difference would be sufficient for the water to be brought in pipes from the spring to the house; the pipes being laid all the way in the ground.

If the distance of the object be greater than 60 minutes, or geographical miles, its height above the true level may be found thus. Suppose an eye at the surface of the sea sees

the top of a mountain, which he knows to be 90 geographical miles, or a degree and a half distant from him: take half that number of miles, and multiply the height of the apparent level above the true, answering to that half distance, by 4; and the product will give the perpendicular height of that mountain. Thus, the half of 90 is 45, against which (in the table) stands 1794 feet 11,703 inches; which being multiplied by 4, gives 7179 feet 11 inches for the perpendicular height of the mountain above the level of the sea.

According to these measures, the earth's circumference is 131,630,400 feet, or 24,930 English miles.

At the distance of 1 second of a degree (or  $\frac{1}{60}$ th of a geographical mile) the height of the apparent level above the true is .0029547 parts of an inch; at two seconds distance it is four times as much; at three seconds, nine times; at four seconds, 16 times as much; and so on, always increasing in proportion to the square of the distance.

A TABLE, shewing the Height of the apparent Level above the true, at any Distance within a Degree of a great Circle on the Earth's Surface; calculated to the 1000th Part of an Inch.

Seconds.	Feet. Inches.	Inches.	Minutes.	Feet.	Feet. Inches.
1	101 6.8	0.003	1	6094	0 10.637
2	203 1.6	0.012	2	12188	3 6.548
3	304 8.4	0.027	3	18282	7 11.732
4	406 3.2	0.047	4	24376	14 2.191
5	507 10.0	0.074	5	30470	22 1.923
6	609 4.8	0.106	6	36564	31 10.929
7	710 11.6	0.145	7	42658	43 5.209
8	812 6.4	0.189	8	48752	56 8.763
9	914 1.2	0.239	9	54846	71 9.591
10	1015 8.0	0.295	10	60940	88 7.692
11	1117 2.8	0.357	11	67044	107 3.067
12	1218 9.6	0.425	12	73128	127 7.716
13	1320 4.4	0.499	13	79222	149 10.025
14	1421 11.2	0.579	14	85316	173 8.836
15	1523 6.0	0.665	15	91410	199 5.307
16	1625 0.8	0.756	16	97504	226 11.052
17	1726 7.6	0.854	17	103598	256 2.070
18	1828 2.4	0.947	18	109692	287 2.362
19	1929 9.2	1.067	19	115786	319 11.928
20	2031 4.0	1.182	20	121880	354 6.768
21	2132 10.8	1.303	21	127974	390 10.882
22	2234 5.6	1.420	22	134068	429 0.267
23	2336 0.4	1.563	23	140162	468 10.931
24	2437 7.2	1.702	24	146256	510 6.866
25	2539 2.0	1.847	25	152350	554 0.075
26	2640 8.8	2.001	26	158444	599 2.558
27	2742 3.6	2.154	27	164538	646 2.315
28	2843 10.4	2.316	28	170632	694 11.345
29	2945 5.2	2.485	29	176726	745 5.649
30	3047 0.0	2.659	30	182820	797 9.228
31	3148 6.8	2.839	31	188914	851 10.080
32	3250 1.6	3.026	32	195008	907 8.206
33	3351 8.4	3.218	33	201102	965 3.606
34	3453 3.0	3.416	34	207196	1024 8.280

If the distance of the object from the place of the spectator be

which measured in a great circle upon the earth, amounts to

the height of the apparent level above the true will be

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# LEVELLING.

TABLE continued.

Seconds.	Feet. Inches.	Inches.	Minutes.	Feet.	Feet. Inches.		
If the distance of the object from the place of the spectator be	35	3554 10.0	3.619	If the distance of the object from the place of the spectator be	35	213290	1085 10.227
	36	3656 4.8	3.829		36	219384	1148 9.448
	37	3757 11.6	4.045		37	225478	1213 5.943
	38	3859 6.4	4.267		38	231572	1279 11.712
	39	3961 1.2	4.494		39	237666	1348 2.755
	40	4062 8.0	4.728		40	243760	1418 3.072
	41	4164 2.8	4.967		41	249854	1490 0.663
	42	4265 9.6	5.212		42	255948	1563 7.527
	43	4367 4.4	5.463		43	262042	1638 11.655
	44	4468 11.2	5.720		44	268136	1716 1.077
	45	4570 6.0	5.983		45	274230	1794 11.763
	46	4672 0.8	6.253		46	280324	1875 7.723
	47	4773 7.6	6.527		47	286418	1958 0.956
	48	4875 2.4	6.808		48	292512	2042 3.464
	49	4976 9.2	7.094		49	298606	2128 3.245
	50	5078 4.0	7.387		50	304700	2216 0.300
51	5179 10.8	7.685	51	310794	2305 6.629		
52	5281 5.6	7.989	52	316888	2396 10.232		
53	5383 0.4	8.300	53	322982	2489 11.108		
54	5484 7.2	8.616	54	329076	2584 9.259		
55	5586 2.0	8.938	55	335170	2681 4.683		
56	5687 8.8	9.266	56	341264	2779 9.381		
57	5789 3.6	9.600	57	347358	2879 11.353		
58	5890 10.4	9.940	58	353452	2981 10.598		
59	5992 5.2	10.285	59	359546	3085 7.119		
60	6094 6.0	10.637	60	365640	3191 0.912		

Ferguson's Tables and Tracts, p. 243, &c. See DEPRESSION of the Horizon.

The operation of levelling is as follows: Suppose the height of the point A (*Plate VII. Surveying, fig. 4.*), on the top of a mountain, above that of the point B, and at the foot thereof, required: place the level about the middle distance, between the two points, as in D, and staves in A and B; and let there be persons instructed with signals for raising and lowering, on the said staves, little marks of paste-board, or other matter. The level being placed horizontally by the bubble, &c. look towards the staff A F, and cause the mark to be lowered, till the middle, upper edge, or other most conspicuous part, appear in the visual ray. Then measuring exactly the perpendicular height of the point E. above the point A, which suppose 6 feet 4 inches, set that down in your book: then turn the level horizontally about, that the eye-glass of the telescope may be still next the eye when you look the other way (if you have only plain sights, the instrument need not be turned); and cause the person at the staff B to raise or lower his mark, till some conspicuous part of it fall in the visual ray, as at C; then measure the perpendicular height of C above B, which suppose 16 feet 8 inches; set this also down in the book above the other number of the first observation; subtract the one from the other, the remainder will be 10 feet 4 inches, which is the difference of level between A and B, or the height of the point A above the point B.

Note, If the point D, where the instrument is fixed, be in the middle between the two points A and B, there will be no necessity for reducing the apparent level to the true

level; the visual ray, in that case, being raised equally above the true level.

If it be farther required to know whether there be a sufficient descent for conveying water from the spring A to the point B, *Plate VII. Surveying, fig. 5.*—Here, in regard the distance from A to B is considerable, it is required that several operations be made. Having then chosen a proper place for the first station, as at I, set up a staff in the point A, near the spring, with a proper mark to slide up and down the staff, as L; and measure the distance from A to I, which suppose 2000 yards. Then the level being adjusted in the point I, let the mark L be raised and lowered till such time as you spy some conspicuous part of it through the telescope, or sights of the level, and measure the height A L, which suppose 13 feet 5 inches. But in regard the distance A I is 2000 yards, you must have recourse to your table for a reduction, subtracting 10 inches 3 lines, which will leave the height A L, 12 feet 6 inches 9 lines; and this note down in your book. Now turn the level horizontally about, so as the eye-glass of the telescope may be towards the staff at A; and fixing up another staff at H, cause the mark G to be moved up and down, till you spy some conspicuous part through the telescope, or sights. Measure the height H G, which suppose 6 yards, 4 feet, 2 inches. Measure likewise the distance of the points I, H, which suppose 1300 yards; for which distance, according to the table, 4 inches 3 lines must be subtracted from the height H G, which, consequently, will but leave 6 yards, 3 feet, 9 inches, 9 lines, to be taken down in your book.

This done, remove the level forwards to some other eminence,

# LEVELLING.

nence, as E, whence the staff H may be viewed; as also another staff at D, near the place whither the water is to be conveyed. The level being again adjusted in the point E, look back to the staff H; and managing the mark as before, the visual ray will give the point F. Measure the height HF, which suppose 11 feet 6 inches. Measure, likewise, the distance HE, which suppose 1000 yards; for which distance the table gives 2 inches, 5 lines of abatement; which being taken from the height HF, there will remain 11 feet, 3 inches, 7 lines, which enter in your book. Lastly, turning the level to look at the next staff D, the visual ray will give the point D. Measure the height of D from the ground, which suppose 8 feet 3 inches. Measure also the distance from the station E to B, which suppose 900 yards; for which distance the table gives 2 inches, 1 line of abatement; which being taken from the height BD, there will remain 8 feet 11 lines, which enter as before.

For the manner of entering down observations in your book, observe, that when a proper place or station for the level, between the two points, has been pitched upon, you must write down the two heights observed at that station in two different columns, *viz.* under the first column, those observed in looking through the telescope when the eye was from the spring, or towards the point, which we may call *back-sights*; and under the second column those observed when the eye was next the spring, which we call *fore-sights*, in the manner following:

Back-sights.		Fore-sights.
feet. inch. line.		feet. inch. line.
First height		Second height
corrected	}	21 : 09 : 9
11 : 3 : 7		Fourth height
Third height	}	8 : 00 : 11
12 : 3 : 7		29 : 10 : 8
23 : 10 : 4		_____

Having summed up the heights of each column separately, subtract the lesser from the greater, the remainder will be the difference of level between the points A and B; as in this example;

feet. inch. line.
29 : 10 : 08
23 : 10 : 04
6 : 00 : 04—The difference of height, or level, between the points A and B.

If the distance of the two points be required, add all the distances measured together; and dividing the difference of height by the yards of the distances; for each 200 yards you will have a descent of about 2 inches 9 lines. This problem may be otherwise solved in the following manner: let the line *fg*, Plate VII. *Surveying*, fig. 6. represent the line of sight of the telescope drawn from *f*, the intersection of the cross-hairs, through *g* the centre of the object-glass; and the points *b*, *b*, be the marks on the glass tube, or spirit-level, *abc*. While these parts of the instrument are immutably fixed, with respect to each other, it is manifest, that as often as the air-bubble is exactly reduced to the marks *b*, *b*, the line of sight will be always reduced to the same position, with respect to the horizon, or to a plumb-line. Now is it at all necessary, in the business of levelling, that the line of sight and plumb-line should be exactly at right angles; but only that the angles they make shall be always the same. Let *p* and *q*, fig. 7, be two given points in two

remote places, and let it be required to find which is the lower, and how much. Let *pa* and *qb* represent two straight staffs, or poles, fixed upright by means of a plumb-line. Having placed the telescope by the side of the pole *pa*, and directed the line of sight to the pole *qb*, alter its elevation by the screw adapted to this purpose, till the air-bubble rests exactly at the marks upon the tube. Then let an alfidant mark the point *b*, which appears to be covered by the cross-hairs; and also the point *a* exactly upon a level with the cross-hairs; which is easily done by a common square applied to the side of the pole *pa*. Then remove the telescope to the pole *bq*, and here let the same things be repeated; that is, let *d* be the place upon a level with the cross-hairs, and *e* the point upon the other pole *pa*, that appears to be covered by them while the air-bubble rests at the same mark as before. Bisect the interval *ac* in *g*, and the interval *bd* in *h*, and the points *g*, *h*, will be upon a level; that is, if we suppose *gpgb* to represent a long canal full of stagnating water, the points *g*, *h*, will both be in its surface; and, consequently, taking the lesser depth *pg* from the greater *qh*, their difference *qr* shews how much the point *q* is below the point *p* or *r*.

If the places *p*, *q*, cannot be seen from each other, or if the difference of their heights be greater than the length of any common poles, then one or more intermediate stations must be chosen; and by repeating the same practice between every two successive stations, we shall find the level of the extremes.

When the points *g*, *h*, are once found upon two poles not far asunder, it will be convenient, by moving the cross-hairs, to rectify the line of sight, so as to be nearly coincident with the line *gh*, or with a line parallel to it, for then in future levellings, at greater distances, the marks *b*, *c*, will be less subject to fall above or below the poles.

This reciprocal way of levelling seems to be the most exact of any, especially if it be performed by two instruments made to agree together before-hand; which may be done by placing them together, and by altering the cross-hairs in either of them, till the same mark upon a remote object is covered by both the crosses, while both the bubbles rest at their marks upon the tubes. Then may two observers find the marks upon the opposite poles at the same time; and, consequently, the refractions of the rays in the air, whatever be their quantities, will be equal as near as possible: and then the result of the practice will be as accurate as if there had been no refractions at all. For let the curve *bias*, fig. 8, represent the course of the visual ray from *b* to *a*; and let the lines *ak*, *bl*, touch it at *a* and *b*. Then, because the points *a*, *b*, are very nearly upon a level, the density and constitution of the air and vapours at the same instant will be nearly the same in each place; and by consequence the curve *aib* and its tangents at *a* and *b*, will be equally inclined to the chord *ab*. For the same reasons the curve *emd* will be similar and equal to the curve *aib*, being situated so very near to it. Therefore, the angle *edn*, under the chord *ed* and tangent *dn*, will be equal to the angle *abl* or *bak*; and, consequently, since the angles *qdn*, *pak*, are made equal in the two observations, by taking away the equal angles *edn*, *bak*, caused by the equal refractions, the remaining angles *qdc*, *pab*, will be equal to each other, as if there were no refractions at all.

If the reciprocal observations be made about the middle of the same day, when the air is the purest, there will scarcely be any occasion for two instruments: but if they be made near the morning or evening, even on the same day, an equality of refractions cannot be depended upon, unless they

## LEVELLING.

are made at the same instant. The members of the Royal Academy of Sciences at Paris tell us, in their Account of the Measure of the Earth, they often found that an object, which at break of day appeared in the level, and sometimes a little above it, did afterwards, when the sun was up, appear below it. And, on the contrary, after the setting of the sun, objects far distant appeared to be raised so sensibly, that in less than half an hour their apparent height was augmented more than three minutes. As to the cause of these appearances, they add, that the coolness of the night condenses the vapours, which descend to a lower place, leaving the air in the higher stations more pure than in the day time. And on the contrary, when the heat of the sun has made a part of the vapours to mount to more elevated stations, there must be less difference of the mediums, and consequently a less refraction.

Setting aside the curvity of a ray, which Mr. Picard tells us is scarcely sensible about noon, when the distance of the object does not exceed 1000 toises, the line of sight through the telescope may be set perpendicular to a plumb-line, or parallel to the horizon, in this manner. Having found two points  $g, h$ , *fig. 9*, upon a level as before, let  $gi$  be perpendicular to  $gc$ , and cut  $cb$  in  $i$ , and having computed the line  $bi$  (as follows), and made a mark at  $i$ , place the level at  $g$ , and alter the place of the cross-hairs in the focus, till they appear to cover the point  $i$ , when the air-bubble is at its marks, and the business is done. Now the line  $bi$  is equal to the square of  $gb$  applied to  $2gc$ , and, consequently, may be found by measuring the distance  $gb$ , and dividing its square by the diameter of the earth, which may be supposed equal to  $2gc$ , though it is not exactly so, the earth being not exactly spherical. For bisecting  $gb$  in  $k$ , draw  $ck$  cutting  $gi$  in  $i$ ; and since the triangles  $kgh, kcg$  are similar, we have  $ki : kg :: kg : kc$ , and by doubling them all, we have  $ki : gb :: gb : 2kc$ . Mr. Picard computes that when the distance  $gb$  is 300 toises, or 1800 Paris feet, the line  $bi$  is one inch: and hence any other  $bi$  may be found for any other known distance; it being as the square of the distance  $gb$ .

Hence, when the instrument is thus rectified, the point  $b$  upon the level with  $g$ , may be found by one observation; that is, by marking the point  $i$  covered by the cross-hairs, and by computing  $ib$  by the rule above. As the intervals between the stations must be but small in this method, because of refractions, as was said above, the readiest way is to make them all equal; which may be known exact enough for this purpose, by observing whether the pole be removed to such a distance, that its image (or the image of any given part of it) in the focus of the telescope shall be always of the same length, being measured by the distance between two parallel hairs in the focus: and then the same allowance must always be made for the depth of the point  $b$  below  $i$ .

Lastly, by means of these parallel hairs, it is easy to find when the telescope is placed in the middle between two stations; and then the points upon a level at each pole are presently found, by directing the telescope first to one pole and then to the other, and by marking the points covered by the cross-hairs. And these points will be upon a level, notwithstanding any refractions of the visual rays, because the refraction of each ray will be equal. Smith's Optics, book iii. chap. 14.

Dr. Halley suggests a new method of levelling, which has been put in practice by some of the French academy: this is performed wholly by means of the barometer, in which the mercury is found to be suspended to so much the less height as the place is farther remote from the

centre of the earth. Hence it follows, that the different heights of the mercury, in two places, give the difference of level.

Mr. Derham, from some observations he made at the top and bottom of the Monument, found that the mercury fell one-tenth of an inch at every 82 feet of perpendicular ascent, when the mercury was at 30 inches. Dr. Halley allows of one-tenth of an inch for every 30 yards; which, considering how accurately the barometers are now made, an inch, in some of them, being divided into an hundred, or more parts, all very feasible, he thinks this method sufficiently exact to take the levels for the conveyance of water, and less liable to errors than the common levels.

The same author found a difference of three inches eight-tenths, between the height of the mercury at the top and bottom of Snowdon-hill, in Wales.

Mr. Ferguson has calculated the following table, for shewing how much the mercury would sink in a barometer at given heights above the earth's plane surface; and consequently, how the perpendicular height of any hill may be found thereby.

At the height of	Merc. finks.		At the height of	Merc. finks.		At the height of	Merc. finks.	
	Inches.	100 parts.		Inches.	100 parts.		Inches.	100 parts.
Feet.			Feet.		Feet.			
100	0 11	3900	4 02	7700	7 38	11500	10 30	
200	0 22	4000	4 12	7800	7 46	11600	10 37	
300	0 33	4100	4 21	7900	7 55	11700	10 44	
400	0 44	4200	4 30	8000	7 63	11800	10 52	
500	0 54	4300	4 39	8100	7 71	11900	10 59	
600	0 65	4400	4 49	8200	7 79	12000	10 66	
700	0 76	4500	4 58	8300	7 87	12100	10 73	
800	0 87	4600	4 67	8400	7 95	12200	10 80	
900	0 98	4700	4 77	8500	8 03	12300	10 87	
1000	1 09	4800	4 86	8600	8 11	12400	10 94	
1100	1 19	4900	4 95	8700	8 19	12500	11 01	
1200	1 30	5000	5 04	8800	8 27	12600	11 08	
1300	1 40	5100	5 13	8900	8 35	12700	11 15	
1400	1 51	5200	5 22	9000	8 43	12800	11 22	
1500	1 61	5300	5 31	9100	8 51	12900	11 30	
1600	1 72	5400	5 40	9200	8 58	13000	11 40	
1700	1 82	5500	5 49	9300	8 66	13100	11 43	
1800	1 93	5600	5 58	9400	8 74	13200	11 50	
1900	2 03	5700	5 67	9500	8 82	13300	11 56	
2000	2 14	5800	5 76	9600	8 89	13400	11 63	
2100	2 24	5900	5 85	9700	8 97	13500	11 70	
2200	2 34	6000	5 94	9800	9 05	13600	11 77	
2300	2 44	6100	6 02	9900	9 12	13700	11 84	
2400	2 54	6200	6 11	10000	9 20	13800	11 90	
2500	2 64	6300	6 20	10100	9 27	13900	11 97	
2600	2 75	6400	6 28	10200	9 34	14000	12 04	
2700	2 85	6500	6 37	10300	9 42	14100	12 11	
2800	2 95	6600	6 45	10400	9 50	14200	12 17	
2900	3 05	6700	6 54	10500	9 57	14300	12 24	
3000	3 15	6800	6 63	10600	9 64	14400	12 30	
3100	3 25	6900	6 71	10700	9 72	14500	12 37	
3200	3 34	7000	6 80	10800	9 79	14600	12 44	
3300	3 44	7100	6 88	10900	9 87	14700	12 50	
3400	3 54	7200	6 97	11000	9 94	14800	12 57	
3500	3 63	7300	7 05	11100	10 01	14900	12 63	
3600	3 73	7400	7 13	11200	10 08	15000	12 69	
3700	3 82	7500	7 22	11300	10 16	15100	12 76	
3800	3 92	7600	7 30	11400	10 23	15200	12 83	

## LEVELLING.

At the height of	Merc. finks.						
Feet.	Inches. 100 parts.						
15300	12 89	17500	14 27	19700	15 59	21900	16 86
15400	12 96	17600	14 33	19800	15 64	22000	16 91
15500	13 02	17700	14 39	19900	15 70	22100	16 97
15600	13 09	17800	14 45	20000	15 76	22200	17 02
15700	13 15	17900	14 51	20100	15 82	22300	17 08
15800	13 21	18000	14 57	20200	15 88	22400	17 14
15900	13 28	18100	14 63	20300	15 94	22500	17 19
16000	13 34	18200	14 69	20400	15 99	22600	17 25
16100	13 40	18300	14 75	20500	16 05	22700	17 30
16200	13 47	18400	14 81	20600	16 11	22800	17 36
16300	13 53	18500	14 87	20700	16 17	22900	17 42
16400	13 59	18600	14 93	20800	16 23	23000	17 47
16500	13 65	18700	14 99	20900	16 29	23100	17 53
16600	13 71	18800	15 05	21000	16 34	23200	17 58
16700	13 78	18900	15 11	21100	16 40	23300	17 64
16800	13 84	19000	15 17	21200	16 46	23400	17 69
16900	13 90	19100	15 23	21300	16 51	23500	17 75
17000	13 96	19200	15 29	21400	16 57	23600	17 80
17100	14 02	19300	15 35	21500	16 63	23700	17 86
17200	14 08	19400	15 41	21600	16 68	23800	17 91
17300	14 15	19500	15 47	21700	16 74	23900	17 97
17400	14 21	19600	15 53	21800	16 80	24000	18 02

By this table, and a common barometer tube, the perpendicular height of any hill may be found in the following manner.

The lower end of the tube being immersed in quicksilver in the common way, and the tube fixed to a board, let a scale, eighteen inches in length, be divided into inches, and each inch into a hundred equal parts, by diagonal lines, the divisions to be numbered downward from the top. This scale must be made to slide in a groove on the board, and have a cross index to slide upon it to any division.

Then, at the bottom or foot of the hill, place the scale so as the beginning of the divisions at its top may be just even with the top or surface of the mercury in the tube. This done, carry the machine up to the top of the hill; then set the index to the surface of the mercury, and it will shew how much the mercury has sunk in the tube, at the top of the hill, from the point where it stood when at the bottom; and the number of feet expressed in the table, against the like sinking of the mercury, will be the perpendicular height of the hill.

Thus, supposing the mercury had sunk eight inches and three hundredths part of an inch, the height of the hill must be 8500 feet, or a mile, and somewhat more than a quarter. Proportionable allowance is easily made for intermediate heights in the table, which are only to whole hundredths of feet.

As Mr. Derham found the difference of height of the mercury at the bottom and top of Snowdon-hill, in Wales, to be three inches eight-tenths (the same as three inches eighty hundredths) it shews, that the height of that hill is 3700 feet, or almost three quarters of a mile.

N. B. 660 feet make an eighth part of a mile, 1320 feet a quarter of a mile, 2640 feet half a mile, 3960 feet three quarters of a mile, and 5280 feet make a whole mile. See **BAROMETER and ATMOSPHERE.**

For the common occasion of levelling to be performed, without much apparatus of instruments, time, or trouble,

the following method may serve: set a pole upright in a spring, pond, river, or other place, whence water is to be brought, and mark how many feet and inches are above water. Then set up another pole, of equal length with the other, in the place to which the water is to come. Place the centre of a quadrant on the top of this last pole, the plummet hanging freely; spy through the sights the top of the pole that is in the water, and if the thread cuts any degree of the quadrant, the water may be conveyed by a pipe laid in the earth. If you cannot see from one extreme to the other, the operation may be repeated in the manner already directed.

**LEVELLING Staves**, are instruments used in levelling; serving to carry the marks to be observed, and at the same time to measure the heights of those marks from the ground. They usually consist each of two long square wooden rulers, made to slide over one another, and divided into feet, inches, &c.

The levelling staff is represented in *Plate VII. Surveying*, fig. 10. It is composed of two pieces which slide on each other, as *aa* and *bb*: they are each of about five feet in length, so as to form, when fully extended; a rod of ten feet. They have a graduated line of feet into hundredth parts. The index, *c*, slides firmly on them; and is moved up or down (by signal) by the attendant who carries the staff, till the observer finds it coincide with the intersecting wires of his telescope. Its height on the staff, of course, marks the difference of the level; and it has two horizontal and parallel black stripes, which, at considerable distances, are of use to direct the eye more readily to the fiducial edge at *x*.

With regard to the manner of directing its application in the business of draining, it has been observed, that after it has been properly adjusted, and the staff about ten feet in length, with the moveable vane or sight, has been affixed to it, the instrument should be set up in a situation between the object from whence the level is to be taken, and that to which it is to be directed, provided the distance from the instrument to each of them is not too great. The situation of it should also be no higher than the length of the staff will answer, and so as it may be seen from it both ways; then the man with the staff should be directed to hold it at the main spring, or place from whence you mean to carry the drain; and after directing the telescope to the staff, and adjusting it to a level, make a sign to him to move the sight up or down, till it be exactly opposite the cross-hair in the telescope. This done, without shifting the instrument from its first position, and cautioning the man to fix the sight to the staff at the point directed, he may proceed forty or fifty yards farther; and after having again adjusted the level, make a sign to him to move to higher or lower ground, till the sight on the staff coincide exactly with the cross-hair or wire on the telescope. He may then leave a peg at the place where he held the staff, and proceed in like manner to other stations, till the whole line is finished; leaving pegs, or making pits, at the places where the staff is held during the operation.

But if the length of the line to be levelled requires the instrument to be shifted from its first position, the level must again be taken from the last station where the staff was held, and the sight on it fixed in the proper place, as before directed; proceeding in the same manner at every forty or fifty yards in length, till the whole is accomplished. After the line is thus levelled, and ascertained by marks left at every station where the staff was fixed, it may again be examined, and other pegs put in between the first, the better to direct the workmen in cutting the drain; giving the line

such turnings, and even small deviations from the course of the level, as may shorten or straighten it, and humour the situation of the ground. And for the sake of accuracy, where the work requires it, especially if the water is to be conveyed to any considerable distance, or wanted to supply a house, or for the purpose of irrigation, the levels may be proved by reversing the former line of direction. The spirit level is also necessary for ascertaining how much fall can be obtained from the drain to the nearest outlet where the water can be discharged; the shorter that distance the better, provided fall enough can be gotten. It is often necessary to level a much longer distance than the length of the drain may require to be cut, in order to come at the true level.

**LEVELLING of Land, in Agriculture,** the method of filling up the holes, hollows, or other depressions and inequalities that are met with in lands, whether they are in the state of fward, or in that of tillage. It should always be performed in such a manner, as the parts thus filled up may at first be somewhat higher than the common surface round them, in order to allow for the settling, which necessarily takes place; and should be done with such materials as can be most conveniently procured, and which are proper for the purpose, being filled in an even and regular manner, and well trodden down at the time. The ridges of such lands as have been long under the plough also sometimes require to be levelled down, the proper methods of doing which, under different circumstances, will be taken notice of under that head. Care is, however, constantly to be taken in the execution of this sort of business. See **RIDGE**.

**LEVELLING Poles,** long wooden rulers, divided into feet and inches, made to slide over each other, serving to carry the marks to be observed in levelling, as well as to measure the heights from the surface of the ground. They are likewise termed staves occasionally. See **LEVELLING Staves**, *supra*.

**LEVEN, in Natural History,** a term used by Boccone for the milky juice contained in the globules placed at the tops of the stalks of red coral. These round buttons are the only part of the coral which are soft while under water, and from these the milky juice is easily expressed by a gentle squeezing between the fingers. The globules are each made up of five or six little cells, not communicating with one another, and each containing its own separate quantity of this white and thick fluid. When the coral is newly taken up out of the sea, this juice is of a sharp, acrimonious, and astringent taste; but when it has been some time exposed to the air, it loses the acrimony, and the astringency of the taste only remains. This change in the taste is made in six or eight hours, in hot weather, and the juice, in the same time, loses its colour and consistence, growing hard and brown. Philof. Transf. N 100.

**LEUENFIORDE, in Geography,** a town of Westphalia, in the principality of Calenberg, on the Weser; 25 miles W.N.W. of Gottingen.

**LEVENHOOKIA, in Botany,** named in memory of the celebrated microscopic philosopher Anthony Van Leeuwenhoek, whose works, as Mr. Brown observes, abound with excellent observations on the structure of vegetables. Brown. Prodr. Nov. Holl. v. 1. 572.—Class and order, *Gynandria Diandria*. Nat. Ord. *Sylidæ*, Brown.

Eff. Ch. Calyx superior, two-lipped, in five deep segments; the fifth (or lip) unlike the rest, vaulted, longer than the column, articulated with the tube, and moveable. Column erect, attached below, like the lip, to the side of the tube. Lobes of the anthers one above the other, divaricated. Stigmas two, capillary. Capsule of one cell.

*L. pusilla*, the only known species, found on the southern coast of New Holland by Mr. Brown. A little smooth herb, with nearly the aspect and stature of *Radiola*. Leaves alternate, stalked; those about the tops of the branches crowded, intermixed with clustered flowers. The moveable joint of the lip is analogous to the irritability in the column of *Styidium*, and answers the same end, which is the preservation of the organs of impregnation; for this lip, which is deflexed in the expanded flower, when affected by any irritating cause, is turned upwards with violence, so as to cover the upright and immoveable column with its concave part. Brown.

**LEVENS, LEVA, or Levenez,** a town of Hungary, near the river Gran, where the Turks were defeated, after a desperate engagement, in the year 1664, with the loss of 12,000 men killed, and 1500 taken prisoners, with their artillery, &c.; 24 miles N.N.E. of Gran.

**LEVENTAN,** a lake of Prussia; 56 miles S.E. of Konigsberg.

**LEVENTI.** See **LAWEND**.

**LEVER, Sir ASHTON, in Biography,** was the son of sir D'Arcy Lever of Alkington, near Manchester. He finished his education at Corpus Christi college, Oxford; and on leaving the university he went to reside with his mother, and afterwards settled at his family-seat, which he rendered famous by the best aviary in the kingdom. He next extended his views to all branches of natural history, and became at length possessed of one of the finest museums in the world, sparing no expence in procuring specimens from the most distant regions. This museum was disposed of by lottery in 1785, but to the great loss of the proprietor. It was, for some years after this, exhibited to the public at a small charge, but is now dispersed, the articles having been sold separately by auction. Sir Ashton died in 1783. Europ. Mag.

**LEVER, or Leaver, in Mechanics,** an inflexible straight bar, supported, in a single point, on a fulcrum, or prop, and used for the raising of weights.

The word is formed of the French *levier*, which signifies the same; formed of the verb *lever*, or Latin *levare*, to raise.

The lever is the first of those called mechanical powers, or simple machines, as being, of all such, the most simple; and is chiefly applied for raising weights to small heights.

In a lever there are three things considered: the weight to be raised, or sustained, as O, *Plate XXX. Mechanics, fig. 4*; the power by which it is to be raised, or sustained, as B; and the fulcrum, or prop, D, on which the lever is sustained, or rather on which it moves round, the fulcrum remaining fixed.

Levers are of three kinds: sometimes the fulcrum, or centre of motion, is placed between the weight and the power, as in *fig. 4*. This we call a *lever of the first kind*, or *velis heterodromus*; to which may be reduced leissars, pinners, snuffers, &c. Sometimes the weight is between the fulcrum and the power, which is called a *lever of the second kind*, as in *fig. 5*. Of this kind are the oars and rudder of a boat, the masts of ships, cutting knives fixed at one end, and doors whose hinges are as the fixed point. And sometimes the power acts between the weight and the fulcrum, which is the *lever of the third kind*. Such is a ladder lifted by the middle to rear it up against a wall: these two are called *velis homodromi*.

In this last, the power must exceed the weight in proportion as its distance from the centre of motion is less than the distance of the centre from the weight. And as the first two kinds of lever serve for producing a slow motion by a swift one, so the last serves for producing a swift motion of the

the weight by a slow motion of the power. It is by this kind of levers that the muscular motions of animals are performed, the muscles being inserted much nearer to the centre of motion than the point where the centre of gravity of the weight to be raised is applied; so that the power of the muscle is many times greater than the weight which it is able to sustain. Though this may appear at first a disadvantage to animals, because it makes their strength less: it is, however, the effect of excellent contrivance; for if the power was, in this case, applied at a greater distance than the weight, the figure of animals would be not only awkward and ugly, but altogether unfit for motion; as Borelli has shewn in his treatise "De Motu Animalium." The power of the lever is founded on the following theorem; *viz.* "That the space, or arc, described by each point of a lever, and consequently the velocity of each point of a lever, is as its distance from the fulcrum, or prop."

From hence it follows, that the action of a power, and the resistance of the weight, increase in proportion to their distance from the fulcrum.

And hence also it follows, that a power will be able to sustain a weight, if the distance of the point in the lever, to which it is applied, be to the distance of the weight, as the weight to the intensity of the power; which, if it be ever so little increased, must raise the weight. See this doctrine demonstrated under the word *Mechanic Powers*; and farther illustrated under the word *BALANCE*; between which and the lever there is a great analogy; a lever of the first kind being a sort of steelyard to raise weights.

The power and action of the lever will be fully illustrated by the following propositions:

1. If the power applied to a lever of any kind sustain a weight, the power is to the weight in a reciprocal ratio of their distances from the fulcrum.

2. The weight of a lever of the first or second kind,  $A, B$ , *fig. 4*, the distance of the centre of gravity from the fulcrum  $C, V$ , and the distances of the weight, and the power  $A, C$  and  $C, B$ , being all given, to find the power that will sustain it. Suppose the lever void of gravity, but in lieu thereof a weight hung at  $V$ ; if then  $A, C$  be made to  $C, V$ , as the gravity of the lever to a fourth number, we shall have the weight which the lever is able to sustain; and this subtracted from the given weight, the remainder will be the weight to be sustained by the power. Let  $C, B$  then be to  $C, A$ , as the remaining weight to a fourth weight, and we shall have the power to be applied in  $B$ , in order to sustain the given weight with the given lever.

3. The gravity of a lever of the first or second kind,  $A, B$ , the distance of the centre of gravity from the fulcrum  $C, V$ , the distances of the power, and the weight  $B, C$  and  $C, A$ , being all given, to find the weight to be sustained. Find the part of the weight sustained by the lever alone, as in the former problem: in the same manner find the other part of the weight, which the power applied in  $B$  is able to sustain; add the two numbers together, and the sum is the weight required.

4. The gravity, and centre of gravity  $F$ , of a lever of the second kind  $C, B$ , *fig. 5*, with the weight  $G$ , its distance from the fulcrum  $C, A$ , and from the power  $C, B$ , being given, to find the power capable of sustaining the weight. Suppose the lever void of gravity, but in lieu thereof a weight equal thereto hung in  $F$ , the power required to sustain the lever alone; then find the power requisite to sustain the given weight  $G$ ; add the powers together, and the sum will be the power required.

5. If a power applied to a lever of any kind lift a weight, the space of the first is to that of the last, as is this last to a

power able to sustain the same weight; whence it follows, that the gain of force is always attended with the loss of time, and *vice versa*.

When the two arms of a lever are not in a right line, but contain any invariable angle at  $C$ , *fig. 6*, the lever is called a bended lever; and is evidently of the first kind, and the law of the equilibrium is the same; *i. e.* if the power  $P$  be applied at  $B$  to the arm  $C, B$ , and the weight  $W$  acts by means of a pulley  $M$ , in the direction  $A, M$ , perpendicular to the arm  $A, C$ , the power and weight will sustain each other, if  $P$  be to  $W$ , as  $C, A$  to  $C, B$ , or  $P \times C, B = W \times C, A$ . If several powers act upon the arm  $C, A$ , find their centre of gravity,  $A$ , on the arm  $C, A$ , and suppose all the powers to be united there; and if the power  $P$  be to their sum as  $C, A$  to  $C, B$ , it will sustain them. The sum of the powers being given, it is manifest that the farther their centre of gravity  $A$  is removed from the centre of motion  $C$ , the greater resistance they will oppose against the power  $P$ , and it will require the greater force in the power to overcome them. Hence Galileo justly concludes, that the bones of animals are the stronger for their being hollow, their weight being given; or if the arm  $C, B, F$  represents their length, the circle  $C, H, D$  a section perpendicular to the length  $P$ , any power applied along their length, tending to break them; then the strength or force of all their longitudinal fibres, by which the adhesion of the parts is preserved, may be conceived to be united in  $A$ , the centre of the circle  $C, H, D$ , which is the common centre of gravity of those forces, whether the section be a circle or annulus. But it is plain that when the area of the section, or the number of such fibres is given, the distance  $C, A$  is greater when the section is an annulus than when it is a circle without any cavity: consequently the power with which the parts adhere, and which resists against  $P$ , that endeavours to separate them, is greater in the same proportion. For the same reason, the stalks of corn, the feathers of fowls, and hollow spears, are less liable to accidents that tend to break them, than if they were of the same weight and length, but solid, without any cavity. In this instance, says Mr. Maclaurin, (View of Sir. I. Newton's Phil. Disc. book ii. chap. 3. § 13.) art only imitates the wisdom of nature. See *MECHANICAL Powers*.

*LEVER, or Vesicis, in Midwifery*, an instrument used to facilitate the birth of the head of the child, when it remains long fixed in the brim of the pelvis of the mother. It is usually called the lever of Roonhuysen, the name of a surgeon of Amsterdam, who has the credit of having invented, or first made use of it. Roonhuysen is said to have been instructed by Dr. Hugh Chamberlen in the method of using the *forceps*, (see that article,) for which he paid him a considerable sum of money: but finding, in many cases, great difficulty in introducing the second blade of the forceps, he confined himself to the use of a single blade; and procuring an instrument to be made upon that principle, he called it his lever. Ruyfch was also said to participate with him in the use of this new contrivance. It was for a long time applied with great caution, and only shewn to such of their pupils as paid them a specific sum for the purpose. At length De Vischer and Van de Poll, two physicians of Amsterdam, purchased the secret of a descendant of Roonhuysen, and published a description of the instrument, and of the manner of using it, in the Dutch language. This account was, many years after, translated into French by M. Preville, and affixed to his translation of Smellie's Treatise of Midwifery, to which he added an engraving of the instrument.

The lever is a flat piece of iron, twelve inches in length,

one inch in breadth, and a quarter of an inch in thickness. It is straight in the middle for four inches, and moderately curved at each end. (See *Plate Surgery*.) In using it, one or two fingers of the right hand (the woman lying on her left side, as in a natural labour) must be introduced under the pubes, and so far, if practicable, as to reach an ear of the child, when the lever is to be slowly and gradually insinuated between the fingers and the head of the child. The fingers are now to be withdrawn, and the handle of the lever to be raised towards the belly of the woman, and gently moved about, until the head of the child is lodged in its curve. The more completely the curve touches and embraces the head of the child, the more speedily and easily the delivery will be effected. During every pain, the handle of the lever must be raised with the right hand, and its middle pressed down with the left hand. This will prevent the soft parts of the woman covering the os pubis from being injured. When by this means the head of the child has been made to descend into the vagina, the left hand must be removed from the middle of the instrument, and applied over the anus and the perineum, to guard those parts, (which will be found to be much distended,) and to prevent their being lacerated; for which purpose, also, the whole of the operation (which will usually be completed within between ten and twenty minutes) must be performed slowly and cautiously, imitating as much as possible a natural labour.

For further information on this subject, see Dr. Bland's Account of the Invention and Use of the Lever, published in the second volume of Medical Communications, 1790.

LEVERANO, in *Geography*, a town of Naples, in the province of Oranto; 7 miles N. of Nardo.

LEVERET, amongst *Sportsmen*, a young hare, in the first year of its age.

LEVERETT, in *Geography*, a township of America, in Hampshire county, Massachusetts, near Connecticut river; 94 miles W. from Boston; incorporated in 1774, and containing 711 inhabitants. A copper-mine has been lately discovered in this township.

LEVERIDGE, RICHARD, in *Biography*, was a singer of Purcell's songs, in the time of Charles II. and in that of William and Mary. During the reign of queen Anne, he performed in 1706 the part of Sir Truitt, in Addison's *Rofamond*; and in the first attempts at opera on the Italian model, he sung his part in English, in Camilla and Thomyris; while Nicolini, Valentini, and the Margarita, performed their parts in Italian.

He had a deep and powerful base voice; was a useful performer on the English stage on many occasions, particularly at Covent Garden, where he attached himself to Rich, and his pantomime entertainments, to the end of his life. He was not, however, without genius for poetry and composition, as far as a ballad went. We remember his singing one written and set by himself, "Ghosts of every Occupation," and several of Purcell's base songs occasionally, which, fifty years ago, seemed antediluvian; but as he generally was the representative of Pluto, Neptune, or some ancient divinity, it corresponded perfectly with his figure and character. As he was not only a celebrated singer of convivial songs, but the writer of many that were in great favour with singers and hearers of a certain class, who more piously performed the rites of Comus and Bacchus than those of Minerva and Apollo, he had always a crowded house at his benefit; nor did he leave this subliminary world, or the stage, till 1758, at 88 years of age.

LEVET, in *Geography*, a town of France, in the de-

partment of the Cher, and chief place of a canton, in the district of Bourges; 6 miles S. of Bourges. The place contains 645, and the canton 5263 inhabitants, on a territory of 2324 kilometres, in 16 communes.

LEVI, BEN-GERSHOM, in *Biography*, a learned rabbi, who flourished in the fourteenth century, was born in Provence about the year 1290. His celebrity is founded chiefly on his philosophical and theological writings. He was a disciple of Aristotle, and philosophizes in the spirit of his master, when discussing subjects of sacred literature. He died in 1370, when he was 80 years of age. He was author of "Commentaries" on all the books of the Old Testament, of which some are inserted in the great bibles of Venice and Basil; and others were separately printed at Pesaro, Venice, and Paris. He was author of a philosophical work, entitled "Millemot Hachem," or "The Battles of the Lord," divided into treatises on the immortality of the soul, the knowledge of future events, prophecy, the interpretation of dreams, the omniscience of God, &c.; and of various other treatises, which were formerly preserved in MS. in the Vatican library, and in that belonging to the congregation of the fathers of the oratory at Paris.

LEVI, *Ile du Fort*, in *Geography*, an island in the river St. Lawrence, Upper Canada, in front of the township of Edwardburg. On this island are the ruins of a French fortification.

LEVIEION, a town of Persia, in the province of Irak; 36 miles S.W. of Isfahan.

LEVIER, a town of France, in the department of the Doubs, and chief place of a canton, in the district of Pontarlier; 10 miles W. of Pontarlier. The place contains 1065, and the canton 7727 inhabitants, on a territory of 310 kilometres, in 15 communes.

LEVIGATION, the reduction of hard and ponderous bodies, as coral, tutty, precious stones, &c. into a fine subtil powder, by grinding them with water upon porphyry, or the like, as painters do their colours.

Levigation is much used in pharmacy and chemistry; but unless the grinding instruments be extremely hard, they will wear away, so as sometimes to double the weight of the medicine thus managed.

LEVIRATE, in the *Jewish Customs*, a term used by authors who have written on the law and customs of the Jews, to denote particularly that law of Moses, which obliges one brother to marry the widow of another, who died without children, to raise up seed to him.

The word is derived from *levir*, which signifies, in Latin, the husband's brother, or the brother-in-law; and the word levirate has been hence formed, to express the law whereof we have been speaking.

This law, which is an exception to that which condemns marriages between brothers and sisters, and between brothers-in-law and sisters-in-law, seems to have been in use among the Hebrews and Canaanites before the time of Moses; since Judah gave his first-born Er, and Onan his second son, successively to Tamar, and obliges himself to give her likewise to Sela his third son. Calm. Dict. Bibl.

LEVISANUS, in *Botany*, a name given by Petiver, who wrote it *Levisianus*, in honour of the Rev. Dr. Lewis, who sent him several plants as well as shells from Madras. The Cape shrub to which this appellation was given, having been referred by Linnæus at one time to *Brunia*, at another to *Protea*, is now *Leucadendron Levisianus*, Brown Tr. of Linn. Soc. v. 10. 55. (See *LEUCADENDRON*.) Schreber in his Gen. Pl. 149, established another *Levisianus* out of  
*Brunia*;

*Bruria*; but this is now *Stavia* of Willdenow, Sp. Pl. v. 1. 1144, a name which we presume will remain.

LEVITA, in *Geography*, an island in the Grecian Archipelago, about eight miles in circumference. N. lat. 37°. E. long. 26° 14'.

LEVITE, an inferior kind of minister in the Jewish tabernacle and temple, who had the care and management of the sacred utensils.

The word comes from the Greek *λειυτης*, the root of which is the name *Levi*; which was given to that patriarch by his mother Leah, from the Hebrew *לוי*, *lavah*, *to be tied*, or *united*; Leah hoping, by the birth of this son, to be more closely linked to her husband Jacob; and, therefore, in a large sense, the Levites were the posterity of this patriarch, and constituted one of the twelve tribes of Israel. In a more restrained and peculiar sense, they were a lower order of ecclesiastical persons, inferior to the priests, and their assistants in the sacred service. The sons of Levi were appointed to this office, in consequence of the extraordinary zeal they discovered against idolatry, in the case of the golden calf. Exod. xxxiii. 26. 28.

When God miraculously destroyed all the first born of the Egyptians (Exod. xii. 29.), he spared the first born of the Israelites; and in order to preserve the remembrance of the miracle, and of that great deliverance from his bondage in Egypt, which that miracle occasioned, he was pleased to appoint that for the future all the first-born males "should be set apart unto himself." (Exod. xiii. 12. 16. Numb. viii. 17.) But afterwards, on the occasion above mentioned, the whole tribe of Levi had the honour assigned them, instead of the first-born of Israel. And that it might appear there was a just substitution of the Levites for the first-born, number for number, he ordered an estimate to be made of both; and when, on casting up the poll, the first-born were found to exceed the Levites by 273, the surplus was redeemed at the price of five shekels a head, which was paid to the priests for the use of the sanctuary. (Numb. iii. 14, ad fin.) We may here observe, as a circumstance worthy of notice, that the posterity of Moses were no more than common Levites, while the descendants of his brother Aaron were advanced, by the appointment of his law, to the dignity of the priesthood. (1 Chron. xxiii. 13, 14.) This is a plain evidence that Moses was not influenced by any worldly or ambitious views, or rather that he was not the contriver and author of the law which he gave to Israel, but received it from God: for if he had framed it, it is natural to suppose that he would have made some better provision than he did for his sons, and for the grandeur of his house, and not have advanced his brother's above his own.

The Levites were originally divided into three classes, or families, from the three sons of Levi, Kohath, Gerson, and Merari; but afterwards by David into twenty-four courses. 1 Chron. xxiii. 6. ch. xxviii. 11—13.

The Levites, in the Jewish church, were an order inferior to the priests; and answered, in some measure, to deacons, in the Christian church. On their first institution, a great part of the service that was assigned them was peculiar to the state of the Israelites at that time; and it was servile and laborious. But when they were settled in the land of Canaan, and the tabernacle was no longer carried about as before, the service of the Levites was, of course, changed, and became much more easy. On which account, in the time of David, they were thought fit to enter on their office at the age of 20 years; whereas, by the original appointment of Moses, they were not admitted till they were 25 or 30 years of age, and were discharged at 50. (Numb.

iv. 3. 13. 43. ch. viii. 24, 25.) It is an opinion among the Jews, that the Levites passed through four different degrees. From one month old to their twentieth year they were instructed in the law of God; from twenty to twenty-five, in the functions of their ministry; from that period to thirty, they served a kind of apprenticeship, beginning to exercise themselves in some of the lower branches of the sacred service; and lastly, when they attained their thirtieth year, they were fully instituted in their office. A similar gradation, probably borrowed from that of the Jewish Levites, has been observed among the vestal virgins; and some have supposed that this gradation is referred to by the apostle, when he tells Timothy, that they who perform the office of a deacon well purchase to themselves a good degree, *καλον βεδμουν*. 1 Tim. iiii. 13.

We have already observed, that the Levites were originally distributed into three families; and in David's time, they were distinguished into three classes, to each of which a different service was assigned; and probably each was divided into twenty-four courses. The first class was appointed to assist the priests in the exercise of their ministry; the second class formed the temple choir; the third class had the charge of the several gates of the courts of the sanctuary assigned them by lot. (1 Chron. xxvi. i. 15. 19. 2 Chron. xxxv. 15. viii. 14.) The Levites exercised the office of magistrates, which office belonged to them, not as Levites, but as persons who generally addicted themselves more to the study of the law, and had more leisure to attend on the duties of the magistracy, than others who were employed in secular business. The magistrates of different ranks, both the "shophetim" and "shoterim," were very generally, though not always, chosen out of the tribe of Levi. Thus the prophetic curse, denounced by Jacob against Levi, (Gen. xlix. 7.) was remarkably accomplished, (though in effect converted into a blessing,) not only in respect to the appointment of their habitation, but likewise of their offices and employments; more of them, than perhaps of all the tribes taken collectively, being officers and judges throughout the whole country; and probably, as the rabbies tell us, some of them were generally directors of their seminaries of learning. Of the consecration of the Levites, and of the ceremonies attending it, we have an account in Numb. viii. 10, 11.

As to the residence and subsistence of the Levites, we may observe that they had no settled lands allotted them for their maintenance, as the other tribes had, but lived chiefly on the offerings made to God. (Deut. xxiii. 1, 2.) They were distributed through all the tribes, each of which gave some of their cities to the Levites, amounting in all to the number of thirty-five, with grounds in their neighbourhood for the subsistence of their flocks. (Numb. xxxv. 4, 5.) In the weeks of their attendance at the sanctuary, they were maintained by the dues arising from the sacrifices; besides these dues, the first fruits, which were brought to the temple, and the money paid for the redemption of the first-born, contributed to their subsistence. But, when they were out of waiting, their maintenance partly arose from the glebes belonging to their cities, and chiefly from the tithes of the produce of the whole country, which the law allotted to the tribe of Levi, (Numb. xviii. 21.) a tenth of which they paid to the priests. See *TITHE*.

According to the numeration made by Solomon, from the age of twenty there were thirty-eight thousand Levites capable of serving; twenty-four thousand of these he appointed for the daily ministry under the priests; six thousand to be inferior judges in the cities, and to decide matters relating

lating to religion, and of no great consequence to the fate; four thousand to be door-keepers, and to take care of the riches of the temple; and the rest to do the office of chantors, or singers.

**LEVITICAL DEGREES**, in *Law*. See **MARRIAGE**.

**LEVITICI**, in *Church History*, a sect of heretics, who sprung from the Gnostics and Nicolaitans.

**LEVITICUS**, a canonical book of the Old Testament, so called from its containing the laws and regulations relating to the priests, Levites, and sacrifice. See **CANON** and **PENTATEUCH**.

**LEVITY**, the privation or want of weight in any body, when compared with another that is heavier.

In which sense, levity stands opposed to gravity.

The schools maintain, that there is such a thing as *positive* and *absolute* levity, and impute to this the rise or emergency of bodies lighter in specie than the bodies wherein they rise.

But we find by experience, that all bodies tend towards the earth, some slower, and some faster, in all fluids, or mediums, whether water, air, &c. Thus, cork is only said to be lighter than gold, because, under equal dimensions, the gold will sink in, and the cork swim upon water.

Archimedes has demonstrated, that a solid body will float any where in a fluid of the same specific gravity; and that a lighter body will keep above a heavier. The reason is, that of bodies falling towards the earth, those which have a like number of equal parts, have equal gravity; since the gravity of the whole is the sum of the gravity of all its parts. Now two bodies have an equal number of equal parts, if under the same dimensions there be no intervals destitute of matter; whence it follows, that as no portion of matter is so small, but that the body wherein it is contained may be wholly divided into parts equally small, there can be no reason for the descent of these, which will not equally hold for the descent of that.

Hence it may be concluded, that those bodies which do not equally gravitate under the same dimensions, do not contain equal portions of matter; and, therefore, when we see, that a cube of gold subsides in water, at the same time that an equal bulk of cork swims upon it, it is evident, that the gold must have a greater number of equal parts of matter, under the same bulk, than the cork; or the cork must have a greater number of vacancies than the gold; and that there is also in the water a greater number of vacancies than in gold. See **FLUIDS**, and *Specific GRAVITY*.

Hence we have a clear idea both of *density* or gravity, and of *levity*; and know, that the latter cannot, in a strict sense, be accounted any thing positive, but only a mere negation or absence of body; which determines that body to be lighter than another which contains more matter.

Dr. Hook, it is true, seems to maintain something like a positive levity; which, if we mistake not, is what he means by the term *levitation*; viz. a property of bodies directly contrary to that of gravitation towards the sun.

This, he thinks, he has discovered in the streams of several comets; which, though they had a descent from the nucleus of the comet towards the sun, yet they quickly returned, and went opposite to the sun, and that to a prodigious extent. In effect, where the power of gravitation ceases, it should seem force such contrary force does begin; whereof we have instances in the phenomena of attraction. This is what sir Isaac Newton calls the *vis repellens*, and appears to be one of the laws of nature; without which it would be hard to account for rarefaction, and some other appearances.

**LEVIZANO**, in *Geography*, a town of Italy, in the department of the Panaro; six miles S.E. of Modena.

**LEUK**, a small town of Switzerland, built upon an eminence about a mile from the Rhine, and the principal place of one of the dixains of the Vallais; containing two churches and a large palace of the bishops of Sion. At the distance of six miles N. are celebrated baths, said to be beneficial in rheumatism, diseases of the skin, &c. and to resemble those of Bath. Here are several springs of different warmth and of different qualities. According to accurate experiments, the mercury in Fahrenheit's thermometer, when plunged into the principal source, stood at 115, and at 120 in the spring which flows near the bridge over the Dola. Leuk is distant 20 miles E. from Sion.

**LEVKOPOL**, a town of Russia, in the province of Tauris; 80 miles S. of Perekop. N. lat. 45° 6'. E. long. 34° 24'.

**LEUNCLAVIUS**, JOHN, in *Biography*, an eminent man of letters in the seventeenth century, son of a gentleman of Westphalia, was brought up to the profession of the law, with which science he was intimately acquainted, as well as with literature in general. He was a great traveller, and resided a considerable time in Turkey. He died at Vienna in 1693, about the 60th year of his age. From his knowledge of the Turkish language he was enabled to collect some valuable materials for the history of that nation, which he published under the title of "Historiæ Mullimanicæ Turcarum," and his "Annales Turcici cum Supplemento et Pandectis Hist. Turcicæ." His intimate knowledge of the Greek language was displayed in several Latin translations of Greek authors, viz. Xenophon, Zozimus, the annals of Constantine Manasses, and of Michael Glycas; the Greek abridgment of the sixty books of Roman law; various works of St. Gregory of Nazianzen, &c. Bayle.

**LEVONOVK**, in *Geography*, a town of Russia, in the government of Irkutsk, on the Lena; 52 miles S.W. of Kirensk.

**LEUPOLD**, JAMES, in *Biography*, a very celebrated mechanician, and noted for his construction of mathematical instruments, and other machines for the elucidation of facts in philosophy, was commissary of mines to the king of Poland, and a member of the Royal Society of Berlin, and other scientific bodies. He died at Leipzig in 1727, after having acquired celebrity by the publication of a work, which is still highly esteemed, entitled "Theatrum Machinarum," in three vols. folio.

**LEVRET**, ANDREW, an eminent French surgeon and accoucheur, was admitted a member of the Royal Academy of Surgery at Paris in February, 1742. He obtained a high and extensive reputation in his department of the art, by the improvements which he made in some of the instruments necessary to be employed in certain difficult cases, (especially the forceps,) and by the prodigious number of pupils whom he instructed. He was employed and honoured with official appointments by all the female branches of the royal family. He published several works, which underwent various editions and translations. "Observations sur les causes et les accidens de plusieurs accouchemens laborieux," Paris, 1747. To the fourth edition, in 1770, were added, "Observations on the lever of Roonhuyfen." "Observations sur la cure radicale de plusieurs polypes de la matrice, de la gorge, et du nez, opérée par de nouveaux moyens," ibid. 1749, &c. "Suite des observations sur les causes et les accidens de plusieurs accouchemens laborieux," ibid. 1751. "Explication de plusieurs figures sur le mécanisme, de la grossesse et de l'accouchement," ibid. 1752. "L'Art des accouchemens démontré par des principes de physique

physique et de mécanique," *ibid.* 1753, &c. "Essai sur l'abus des règles générales, et contre les préjugés qui s'opposent aux progrès de l'art des accouchemens," *ibid.* 1766. Eloy Diët. Hill.

LEVROUX, in *Geography*, a town of France, in the département of the Indre, and chief place of a canton, in the district of Chateauroux; 10 miles N. of Chateauroux. The place contains 2800, and the canton 8904 inhabitants, on a territory of 552½ kilometres, in 15 communes. N. lat. 46° 59'. E. long. 1° 41'.

LEUSDEN, JOHN, in *Biography*, an eminent philologist, was born at Utrecht in 1624. He laid the foundation of a learned education in his native city, and then went to Amsterdam to improve himself in the Hebrew language, and in the knowledge of the Jewish ritual from conversation with the learned rabbis. He obtained, in the year 1649, the professorship of Hebrew and Jewish antiquities at Utrecht, which he held, with great reputation, till his death in 1699. He was a capital critic, and was highly celebrated as a teacher. He gave correct editions of the works of Bochart and Lightfoot, and of Poole's Synopsis. His own writings are numerous and very valuable, of which the principal are "Clavis Hebraica et Philologica Vet. Test." 4to. "Clavis Græca Novi Test. cum Aenot." "Compendium Græcum Novi Test." "Philological Notes upon Jonas, Joel, and Hosea," two vols. 8vo. Moreri.

LEUTENBERG, in *Geography*, a town of Germany, in the county of Schwartzburg-Kudolstadt, on the Sorbitz; near which are mines of silver and copper; eight miles S.E. of Saalfeld. N. lat. 50° 28'. E. long. 11° 35'.

LEU'HEN, a town of Silesia, in the principality of Breslau; 10 miles W. of Breslau.

LEUTKIRCH, a town of Bavaria, near the Eschach, on a heath to which it gives name. This town was free and imperial till the year 1802, when it was conveyed, among other indemnities, to the elector of Bavaria. It has a Lutheran and a Roman Catholic church, together with a nunnery of Franciscans. The magistrates are mostly Lutherans; 28 miles S. of Ulm. N. lat. 47° 53'. E. long. 10°.

LEUTMISCHL, or LITOMYSL, a town of Bohemia, in the circle of Chrudim; 22 miles E. of Chrudim. N. lat. 49° 47'. E. long. 16° 5'.

LEUTO, *Ital.* in *Music*. See LUTE, and THEORO.

LEUTSCH, in *Geography*, a town of the duchy of Carniola; eight miles S.S.E. of Hydria.—Also, a town of Hungary, which has frequently suffered from fire; 14 miles W. of Szeben.

LEUTZBURG, a town of Switzerland, in the canton of Berne; six miles S. of Brugg.

LEVY, LEVARE, in *Law*, signifies to gather or collect; as, to levy money, to levy troops, &c.

LEVY sometimes also denotes to erect, or set up; as, to levy a mill. Levy also signifies to raise or call up; as, to levy a ditch. To levy a fine of lands, is to pass a fine.

LEVYING Money without Consent of Parliament. No subject of England can be constrained to pay any aids or taxes, even for the defence of the realm or the support of government, but such as are imposed by his own consent, or that of his representatives in parliament. See *lats.* 25 Edw. I. c. 5. & 6. 34 Edw. I. *lat.* 4. c. 1. 14 Edw. III. *lat.* 2. cap. 1. the petition of right, 3 Car. I. c. 1. *lat.* 1 W. & M. *lat.* 2. c. 2.

LEVYING War against the King. See TREASON.

LEUZE, in *Geography*, a town of France, in the département of the Jemappe, and chief place of a canton, in the district of Tournay, seated on a brook near the Dender; eight miles E. of Tournay. The place contains 3528, and

the canton 14,448 inhabitants, on a territory of 122½ kilometres, in 15 communes.

LEWALDE, a town of Prussia, in the province of Oberland; 12 miles N.N.W. of Soldau.

LEWARDEN, a city of Holland, and capital of Friesland, situated in a quarter called "Ooltergoog." From being a small town in 1190, when it was surrounded with a wall, it has become large, rich, and populous, fortified with ramparts, and defended by a large ditch, bastions, and other works: the streets are regular and spacious, and separated by canals which intersect each other, facilitate communication with the sea and with the internal parts of the province, and contribute to an extensive trade with Holland, Bremen, Hamburg, and other places. The town house, erected in 1715, is a handsome building. The magistracy consists of three burgo-masters and nine eschevins; 28 miles W. of Groningen. N. lat. 53° 12'. E. long. 5° 43'.

LEWCKOCE, a town of Poland, in Podolia; 44 miles N.N.E. of Kamniec.

LEWDNESS is punishable by our law by fine, imprisonment, and such corporal infamous punishment, as the court may think meet, according to the heinousness of the crime. (1 Hawk. 7.) And Mich. 15 Car. II. a person was indicted for open lewdness, in showing his naked-body in a balcony, and other misdemeanors, and was fined two thousand marks, imprisoned for a week, and bound to his good behaviour for three years. (1 Sid. 168.) In times past, when any man granted a lease of his house, it was usual to insert an express covenant, that the tenant should not entertain any lewd women, &c. See ADULTERY, BASTARD, BAWDY-HOUSE, INCEST, &c.

LEWEHAGEN, in *Geography*, a town of Prussia, in the circle of Natangen; eight miles E.S.E. of Konigsberg.

LEWEN, a town of Bohemia in the circle of Leitmeritz; eight miles N.E. of Leitmeritz.

LEWES, a considerable borough and market town in the hundred of Barcombe, rape of Lewes, and county of Sussex, England, is situated on the eastern extremity of one of those bold and fertile eminences called the South downs, and so justly celebrated in the topography of that county. Lewes, being anciently a demesne of the crown, appears to have appertained to the South-Saxon kings, then to the West-Saxon, and afterwards to the Saxon and Danish monarchs of all England; and, though each of those revolutions by which it changed its royal lord, removed the court still farther from this town, its natural advantages secured it a respectability not inferior to that of the first boroughs in the kingdom. During the Danish ravages from the close of the eighth century to the beginning of the eleventh, Lewes was rendered, both by art and nature, the most eligible place of refuge for the inhabitants of the adjacent country, and a firm barrier against the invaders. In the reign of Athelstan, Lewes was a very considerable place; for it was then the chief town and mart of more than half the shire. And in that king's ordinance for prohibiting the coinage of money, except in towns of especial note, Lewes was allowed two mints, and Chichester but one; a proof of the early respectability of the former. On the death of Edward the Confessor, this town, with the other appanages of the crown, devolved to Harold, and on his defeat was given by the Conqueror to his son-in-law William, lord of Warren, who made it his chief residence, and built here a grand mansion and fortifications; the gate and two towers of his castle still remain. In the time of Edward the Confessor here were 127 burgesses. Lewes continued in the possession of the lords Warren for nearly three centuries, when the male line being extinct, it descended to Richard Fitz-Allen, earl of Arundel, son of Alice, sister of the late earl of Warren.

**ren.** In his heirs the barony of Lewes has continued to the present time. A memorable battle was fought in the vicinity of this town in the year 1264, between Henry III. and the confederate barons under Simon de Montfort. A particular account of this is printed in *Lees History*, &c. of Lewes, 8vo. 1795.

Lewes is a well built town, and one of the largest and most populous in the county. It had formerly twelve parish churches, which are now reduced to six, including St. Thomas at Cisse, so called from its standing under the high chalky cliffs at the out-forts of the town. The other churches are All-Saints, St. John's under the Castle, St. Michael's, St. Peter's and St. Mary's Weilton, now called St. Ann's, and St. John's, Southover. The dissenters, who have been respectable and numerous in this town, have also their places of worship.

Lewes is a borough by prescription, but not incorporated; the civil government is vested in two constables, who are annually chosen by the burgesses. Two members have been returned to parliament ever since the 26th year of Edw. I. The right of election is in the inhabitants paying foot and lot, in number about 310. In the year 1504 an act of parliament was obtained for holding the shire or county-court alternately at Lewes and Chichester. From the town-book, since that time, a few items may be extracted, calculated to display the local and general customs of the ages in which they occurred. In 1542 the duke of Norfolk's officers were treated with "two couple of rabbits," price 6*d.*; a pottle of sack, 6*d.*; a quart of sack and a quart of red-wine, 6*d.* In 1544, the "year's wages" of John Payne, one of the burgesses in parliament for this borough, was 63 shillings. The two burgesses were paid 6*l.* 10*s.* in the year 1555. The following year was distinguished by the burning of four men, in this town, for "heresy." Here are a free grammar-school, a charity-school, and several private charities. On the banks of the river Ouse, which is navigable for barges, are several iron-works, where cannon of small sizes, and several other articles, are cast.

Lewes is 40 miles distant from Chichester, and 49 from London. Four fairs are held annually; and a weekly market on Saturdays. The population, in the year 1801, was stated in the parliamentary return to be 3309, occupying 512 houses. The farmer assizes are alternately held here and at Horsham.

A priory of Cluniac monks, the first and chief house of that order in England, was founded at Lewes, in 1078, by William lord Warren and Gundreda his wife. Here was also a priory of Grey Friars; and two hospitals dedicated to St. James and St. Nicholas.

LEWES, See *LOUISOVNE*.

LEWESTEIN, a town of Prussia; 16 miles N.W. of Ralenburg.

LEWING, a town of Silesia, in the principality of Glatz; 15 miles W. of Glatz. N. lat. 50 14'. E. long. 16° 4'.

LEWING, in *Metallurgy*, the sifting of the ores of metals in water. This is done in fine sieves moved backward and forward under water; and is the method of separating the finer part of the ores which had subsided on the larger lumps, under that part of it separated for use in the various washings. The coarser matter, left in the sieve, is powdered again with the larger masses, and all thus sifted together for the blowing-houe.

LEWIS I., in *Biography*, emperor and king of France, surnamed *L. D. bonnaire*, the son of Charlemagne, by a second wife, was born in 778, and while a child he was crowned king of Aquitaine, to which state he was sent to reside. Here he was carefully educated in the dead lan-

guages, and in the other branches of learning that were cultivated at that period. During his administration in Aquitaine, on account of the suavity of his manners, he obtained the surname already mentioned; and at his father's death in 814, he succeeded to the imperial throne, without opposition. At this period he had three sons, Lothaire, Pepin, and Lewis, among whom he divided his dominions: the first he raised to the dignity of emperor by associating him with himself; the second he created king of Aquitaine; and to the other he gave the title and power of king of Bavaria. A worse system could not have been adopted, which Lewis found to his cost, as each of his sons, feeling themselves independent of the father, violated every tie of filial and fraternal duty. Bernard, king of Italy, natural son of Pepin, the eldest son of Charlemagne, took up arms with the hope of deposing Lewis, but his army, in the critical moment, deserted him, and he was obliged to throw himself at the emperor's feet, to implore that clemency, which his misdeeds were ill calculated to inspire. The emperor referred him to the assembly of the states of Aix-la-Chapelle; by whom his conduct was investigated, and himself and associates were condemned to death. This sentence was commuted for that of depriving the guilty of their eyes; the extreme torture of the operation was the cause of Bernard's death, which happened almost immediately after the cruel deed had been performed. The recollection of the sufferings of his nephew so afflicted the mind of Lewis, that he performed a public penance on account of it, a circumstance that rendered him contemptible in the eyes of his subjects. The fierce nations of the north, scarcely to be controlled by the genius of Charlemagne, disdained the weak arm of his successor, and it was with the utmost difficulty that their rude assaults were repelled, and themselves confined within their proper circle. The most disastrous events of this period were the death of the empress, and the subsequent marriage of Lewis with Judith, daughter of Guelf of Bavaria, whose splendid accomplishments concealed an ambitious mind, the source of equal calamities to her consort and the empire. For a time Lewis was obliged to resign his power, but the jealousy of his three sons against each other caused a change in his favour, and he was again restored to power. The three brothers, in 832, joined in a new league against their father; they were supported by the pope, Gregory IV., and the emperor, deserted by his troops, surrendered himself a prisoner to his undutiful children. He was now solemnly deposed, the imperial dignity was conferred upon Lothaire, and Judith was sent into a nunnery. The misfortunes and distresses of the great ever affect the minds of the multitude, and the compassion of his people soon began to operate in favour of the fallen sovereign. Pepin and Lewis took up arms against their elder brother, who was obliged to throw himself at the feet of his father, and ask his pardon. Lewis was again reconciled to the church, and replaced on the throne by the bishops. He now recalled his empress Judith, whose mind, unbroken by adversity, engaged in new plots against the government, with the hope of advancing her son Charles, to the prejudice of the other branches of the family. She had the address to cause him to be declared king of Neustria, and afterwards, on the death of Pepin, king of Aquitaine, in opposition to the claims of the sons of Pepin. This circumstance induced Lewis of Bavaria to assemble an army, with the intention of seizing for himself as much of the territory bordering on his dominions as he could occupy. He accordingly made himself master of the best part of Germany: the unwelcome news was received by the emperor at a moment when his mind was broken down with age, and with terror occasioned by a total eclipse of the sun: he withdrew from the seat of govern-

ment, to an island in the Rhine, where he refused almost all assistance, excepting the elements administered at the sacrament, and died at the age of sixty-two, in the year 840. He appointed Lothaire his successor in the empire, but his last moments were embittered with the most lively resentment against the king of Bavaria: he was reminded by the bishop of Mentz that it was his duty to forgive; he replied, "I pardon him, but tell him from me, that he must seek pardon of God, for having brought my grey hairs with sorrow to the grave." The placid virtues and the urbanity of temper, which distinguished the character of this emperor, very ill compensated for the miseries which were engendered by his feeble administration; and a prince, to whose name has been added the epithet of gentle, lived without the regard, and expired without the regret of his subjects.

Lewis II, emperor and king of Italy, the eldest son of the emperor Lothaire I, was created by his father king of Italy in 844, and was sent to Rome, where he was crowned by pope Sergius II. In about two years he returned to Germany, and was associated with his father in the empire. An irruption of the Saracens gave him employment; he hastily went into Italy, and defeated them in several engagements. He afterwards called a council, to be held at Telfino, for the reformation of ecclesiastical abuses. In 855, by the death of Lothaire, he succeeded to the title of emperor, in addition to his kingdom of Italy. The repeated incursions of the Saracens called forth his military talents and ardour, and the factions of his own nobility were a source of much uneasiness and great disorders. He lived, in general, on good terms with the holy see, and in 871, was crowned king of Lorraine by pope Adrian II. He died in 875, greatly respected by his subjects, to whom he administered justice with impartiality.

Lewis III, emperor, called also Lewis IV, was son of the emperor Arnulf, whom he succeeded when he was only seven years old, in the year 880. During the course of his reign, Germany was desolated by the Hungarians, and torn asunder by civil discord. He died in 912, and his death is regarded as an era in the Germanic history, as he was the last king or emperor of the race of Charlemagne.

Lewis IV or V, emperor, son of Lewis, duke of Bavaria, and Matilda, daughter of Rodolph I, was born in 1284. By the death of his father, when he was only 12 years of age, his education devolved chiefly on his mother, and he distinguished himself beyond all the princes of his age. In 1314, he was chosen emperor at Frankfort by a part of the electors, while another part of them adhered to Frederic, son of Albert, emperor and duke of Austria. Lewis was crowned at Aix-la-Chapelle by the archbishop of Mentz, while Frederic received a similar honour from the elector of Cologne. A civil war ensued, and in 1316 an indecisive battle was fought between them, at Eßlingen on the Neckar. In Italy, the Ghibelline faction espoused the cause of Lewis, while the Guelphs supported that of Frederic, and the flames of war spread over Lombardy, till at length he gave his rival a signal defeat and took him prisoner. From this period those contests commenced between Lewis and the holy see, which disgraced all the latter part of his reign. The pope, John XXII, issued a bull, assuming the right of deciding between the competitors of the empire, and commanding Lewis to desist from exercising the imperial functions, till he should obtain his express permission. The emperor protested against the bull, and was excommunicated. To conciliate the minds of the German princes, he made a peace with the Austrian family, and set at liberty duke Frederic, whom he had hitherto kept in prison. In 1327, he marched into Italy, and was crowned

king of that country; and in the following year he proceeded to Rome, and was crowned at St. Peter's by the bishops attached to his party. The pope renewing his bulls of excommunication and deposition against him, he retaliated by publicly pronouncing his holiness a heretic, and a defiler of his flock; and he even pronounced upon him sentence of death. By a change of circumstances he was obliged to quit Rome in haste, and from this moment his cause declined in Italy, and he found it necessary to return into Germany. He now sought a reconciliation with the pope, and was treated with contempt. The death of John, in 1336, was of no advantage to the emperor, as the succeeding pope, Benedict XII., persevered in the hostility manifested by his predecessor. About the year 1336, the princes of the empire, as well ecclesiastical as secular, assembling at Spire, declared the empire independent of the see of Rome, and pronounced Lewis the lawful emperor: after this a diet was convoked at Frankfort, in which a constitution was passed into a law, for ever establishing the independence of the empire. These decrees did not put an end to the disputes between Lewis and the holy see: the breach was widened by the secret investigations of Philip of Valois; nevertheless, the emperor retained the allegiance of the greater part of the empire. He died, as he was in the act of hunting, in October 1347, at the age of sixty-three. This prince is said to have surpassed all his contemporaries, both in personal and mental qualities, and accomplishments. His manners were gay and highly polished for the times in which he flourished; and although he was capable of concerting his measures without assistance, he willingly sought the aid of good counsel. He appears to have been famed for piety; for, notwithstanding the papal anathema, he received the appellation of "Most Christian," and the monks of Germany, as fervid, as superstitious, preserved his knives, napkins, &c. with religious veneration. Modern Univer. Hist.

Lewis I. king of France, has already been noticed under the first emperor of that name, having reigned as chief of the Germanic empire, and monarch of France. We therefore proceed to

Lewis II. king of France, surnamed the *Stammerer*, son of Charles the Bald, who was born in 843, created king of Aquitaine in 867, and succeeded his father in the throne of France in 877. This prince exposed his kingdom to the fatal consequences of a weak and divided administration. To obtain the support of the principal people, he profusely lavished the honours and estates of the crown upon those who made the earliest application, so that having exhausted his bounties, those who were the last to present their claims were disappointed in their hopes and expectations. Neglected themselves, they murmured, and denied the right which he had assumed of disposing of these possessions, without the consent of the general assemblies. His party prevailed by the force of numbers; and at his coronation he took a solemn oath to maintain the privileges of the grandees, and to respect the donations which he had conferred on them. The vassals of Lewis soon became his equals, and contended for the superiority. A rebellion caused him to take the field in his own defence, but on his arrival at Autun he was attacked with a dangerous disease, supposed to have been occasioned by poison, which carried him off, after a reign of about eighteen months. At the time of his death the queen was pregnant, and was afterwards delivered of a son, who in due time succeeded to the kingdom, under the title of Charles the Simple. Previously to his death, and sensible of his approaching end, he desired that his sword and crown might be delivered to his son,

Lewis III. king of France, who was at that time about seventeen years of age. The great lords were desirous, in opposition to the wishes of the late sovereign, to establish his other son Carloman on the throne. To prevent, however, the evils of a civil war, they agreed that the crown should be worn by both. The division of territory was made in 88c, when Lewis had for his share France Proper, and Neustria; and to Carloman were assigned Burgundy and Aquitaine. The two brothers lived and reigned together in the most perfect harmony, and they displayed some of the qualities of their ancestor Pepin. They, in some measure, put a stop to the ravages of the northern brigands, fifty thousand of whom had entered by the river Somme, and had taken several strong places, among which was Amiens. Lewis defeated them in an engagement near Courtray, but having neglected to follow up his victory, they rallied, and made incursions into Picardy; here he again encountered, and gave them a most signal defeat, leaving on the field of battle 9000 of the enemy, with their leader Guaramond. This victory had displayed much wisdom and valour; and the demise of Lewis of Germany proclaimed the moderation of the young king of France, who rejected with firmness the crown offered him by the inhabitants of Lorraine, and yielded to the superior pretensions of the emperor, Charles the Fat. The French were, however, permitted to contemplate the rising virtues of their prince only a short time. While he was indulging the hope of erecting fresh trophies over the Normans, a mortal disease compelled him to renounce the enterprise. He returned to St. Denis, where he expired in the twenty-second year of his age. His premature death was marked with the suspicion of poison, a suspicion countenanced by the turbulent temper of the nobles, jealous of his active and glorious reign.

Lewis IV. king of France, surnamed *D'Outre-mer*, beyond the sea, on account of his having been educated in England, was the only son of Charles the Simple, by Egira, daughter of Edward the Elder. He was born in 917, and upon the deposition of his father, was taken by his mother to the court of Athellian, in England. Here he remained till the year 936, when he was invited to return and ascend the throne of his ancestors. He landed at Boulogne, proceeded to Laon, and was crowned in that city by Artaud, archbishop of Rheims. His return was chiefly owing to the influence of the powerful Hugh the Great, duke of France. The first measures of Lewis promised to maintain the internal tranquility of his kingdom. To discharge his obligation to Hugh, and to secure the fidelity of that nobleman, he appointed him minister, and committed the reins of government into his hands. The servant soon raised himself above the master; and the attempts which Lewis made to free himself from this state of dependence, gave rise to a civil war, which for several years threw the kingdom into confusion. By the mediation of Otho, his brother-in-law, emperor of Germany, and that of William, duke of Normandy, a peace was concluded in 942, between Lewis and his rebellious subjects. On the death of the duke of Normandy, Lewis attempted to add that duchy to the kingdom: for this purpose he united with Hugh the Great, in an open invasion of the country. Lewis was entirely defeated and carried prisoner to Rouen, whence he was not released till he had entered into a treaty to secure the independence of Normandy; even after this he was detained in captivity till he had procured for himself a grant of the city and territory of Laon. Lewis seized upon the first opportunity to avow his resentment against his powerful vassal, and the provinces of France were alternately afflicted by the arms of Lewis,

of Otho, and of Hugh. During five years the flames of civil war raged without intermission, and the precarious peace which was concluded in a personal interview, may be considered as a suspension of hostilities rather than a restoration of tranquillity. The latent embers of discord were still kept alive: they broke out with renewed violence, and were finally extinguished by the two sisters, consorts of the king and Hugh. A permanent peace was established, and Lewis prepared to assert his authority over the revolted lords of Aquitaine, when his plans were broken by a sudden and accidental death. As he was pursuing a wolf, roused by chance, with inconsiderate ardour, his horse stumbled and threw him: the injury proved fatal, and in a few days he closed his life at Rheims, after a stormy reign, having been eighteen years on the throne.

Lewis V. was associated with his father Lothaire in the government, whom he succeeded in the year 986, being in the nineteenth year of his age. He manifested a violent and turbulent character: he quarrelled with the queen-dowager; expelled the bishop of Laon from the kingdom; and upon a dispute with the archbishop of Rheims, forcibly entered that city with a considerable slaughter. At the time that he was preparing to march against the Saracens, he was taken off by poison, administered, it was imagined, by his own wife Constance. With him ended the race of kings of the house of Charlemagne, which had swayed the sceptre nearly 240 years.

LEWIS VI., surnamed *Le Gros*, son of Philip I., was born in 1081. He was associated with his father in the government in the year 1100, having already acquired a high reputation for valour, prudence, moderation, and a freedom from those vices incident to his age and rank. By the vigour of his conduct he held in awe the discontented nobles, repressed the rebellious, demolished their castles, and compelled them to restore the estates which they had usurped from the clergy. His mother-in-law, Bertrade, jealous of the reputation of the young prince, and considering him as the only obstacle to the elevation of her own sons, attempted, by every means in her power, to destroy him. He happily escaped her machinations, and Philip, discovering her real character, forced her to make such submissions as disarmed the resentment of his son. In 1108, Lewis, by the death of his father, succeeded to the throne, and in a short time he became engaged in a quarrel with Henry I., which may be regarded as the commencement of the long contests between the kings of France and England. Lewis, in the first instance, wishing to avoid the effusion of blood, sent a challenge to Henry to decide the point at issue in single combat, which Henry declined. A battle ensued, Lewis was victorious, and in a treaty concluded not long after, it was agreed that William, the son of Henry, should do homage to the sovereign of France for the duchy of Normandy, which Henry himself had refused to do. War was again renewed, and in an action at Breneville, an English warrior seized his horse's bridle, crying, "the king is taken;" to which Lewis replied, "at cheis, the king is never taken," and instantly laid his antagonist dead with his sword. Lewis endeavoured to deprive Henry of the dukedom of Normandy, but was unsuccessful. In 1119, at a council at Rheims, in which the emperor Henry V. was excommunicated by pope Calixtus II. Lewis lodged his complaints against the king of England, but was unable to draw down the censures of the church upon him. After this the emperor, excited by Henry I., who was his father-in-law, invaded France, but the common danger induced the French to rally round the standard of their king, and he shortly found himself at the head of 200,000 men. It was at this crisis

eris that the famous oriflamme, or banner of the abbey of St. Denis, was displayed as the king's standard. Lewis next had a dispute with some of his prelates, which brought upon him a sentence of excommunication from the bishops of Paris and Sens, but it was taken off by the pope. He now attempted to put an end to the schism in the popedom between Innocent II. and Anaclet, the former of whom he supported as lawful pontiff. The gross habit of his body, from which he derived his surname, forewarned him of his approaching end, for which he prepared by settling the affairs of his kingdom. He caused his son Lewis to be solemnly crowned, and when he found himself almost in the last stage of existence, he drew the signet from his finger, and fixed it upon that of his son, charging him at the same time to remember, that the sovereign authority, of which this was the symbol, was a public trust, for which a strict account would be required in a future world. He died in 1137, greatly lamented by his people, whom he had never burthened with taxes, and whom, in many respects, he had freed from the oppressions of the great. Lewis VI. was unquestionably one of the most irreproachable monarchs of France. His reign is reckoned the era of the commencement in France of that balance to the power of the feudal lords which arose from the order of citizens. He conferred new privileges on the towns within his domains, by what were entitled charters of community, and formed them into corporations or bodies politic, with the right of administering justice, levying taxes, and embodying a militia within their own districts.

LEWIS VII., son of the preceding, was born in 1120, and succeeded to the throne in 1137, having by his marriage with Eleanor, the heiress of the duke of Guienne and count of Poitou, united to the crown of France an extensive country from the Loire to the Pyrenées. He began his reign by repressing some outrages of his nobles, and a revolt of the commons. The election of an archbishop of Bourges, without his consent, involved him in a quarrel with the clergy, and with pope Innocent II. who supported them. In the course of this dispute, Lewis made an incursion into Champagne, sacked the town of Vitri, and set fire to a church, in which more than 1300 people miserably perished. Struck with remorse for this savage act, he resolved to expiate the foul crime by an expedition to the Holy Land. In 1146, Lewis took the cross, and his example was followed by the queen, and all the principal nobility. In the following year he set out at the head of 80,000 men, on his march by land to Constantinople: from this city the French army marched through Asia Minor, to Antioch, and at length undertook the siege of Damascus. The enterprize entirely failed, and Lewis returned dispirited and disgraced. To public calamity succeeded the pang of domestic misery, and it could not be concealed from the eye of a husband that the fidelity of his queen, who had accompanied him in this expedition, had been sacrificed to her own uncle, Raymond. On his return he determined to divorce himself from the queen, which he carried into effect in 1152. By this event the provinces of Aquitaine were detached from the crown of France, and in six weeks they were transferred to that of England by Eleanor's marriage to Henry Plantagenet, then duke of Normandy, and soon after king of England, under the name of Henry II. The facility with which he parted from these wealthy provinces has for ever annexed to him, by way of reproach, the surname of *Young*. Lewis married for a second wife Constance, daughter of Alphonso, king of Castile, and soon after displayed his piety in a pilgrimage to the shrine of St. James, at Compostella. This queen dying without any male issue, he married Adelaide,

daughter of his old enemy, Thibault, count of Champagne, by whom he had a son, named Philip. While a mere child, the royal youth, engaged in the pleasures of the chase, was lost in the thickneses of a gloomy forest, and the heir of France was condemned to pass a tedious night, oppressed by solitude and despair. His feeble mind was incapable of sustaining the horror of his situation, and when found in the morning, a dangerous fit of illness was the effect of the fright. The superstitious monarch visited the tomb of Becket, to solicit the interposition of a saint, who had experienced his earthly protection. Having been kindly received at Canterbury by Henry, and having presented his offerings at the shrine of Thomas, he embarked again for France, and on his arrival his heart was gladdened with the intelligence of his son's complete recovery. The mind of the king had, however, received a blow, from the effects of which he never recovered, and in 1180, he experienced a paralytic seizure. Sensible of the great danger which hung over him, he determined to hasten the coronation of his son, and having languished about a year under his malady, he expired, after a reign of forty-three years. "If," says the historian, "the prudence and judgment of the king, in restoring the dowry of Eleanor have been arraigned, his humanity has been seldom, and his piety has never been impeached. A tender husband and an affectionate father, the errors of the monarch, were lost in the virtues of the man."

LEWIS VIII., grandson of the preceding, was born in 1187, and displayed, at a very early age, a martial disposition under his father at the war in Flanders, and against king John of England in Poitou. In 1216, he was invited by the barons of England to ascend the throne, of which their own sovereign had proved himself unworthy. He landed in Kent, and marched to London, where he was at first received with respect and gratitude: in a very short time the tide of public favour completely turned, and he was glad to obtain permission to return un molested. He succeeded to the crown of France in 1223, and scarcely had ascended the throne of his ancestor, when he was urged by Henry III. of England, to make restitution of the provinces taken by his father from king John; he refused, and war was declared. Lewis was every where victorious, and the power of the English in France was greatly curtailed, so that nothing was left in their possession but the town of Bourdeaux, and the country beyond the Garonne. To preserve these, Henry conferred on his brother Richard the title of count of Poitou, and furnished him with ample means to support his new dignity. The inhabitants of Poitou crowded to his standard, and the spirit of opposition being revived, the career of Lewis was checked, and he was glad to make a truce for three years. The court of Rome strongly solicited the king of France to resume the cross, and to march against the Albigenses. From Lyons he directed his march along the banks of the Rhone, and invested Avignon with 50,000 men. The inhabitants, animated by despair, defended themselves with the most obstinate valour; and the king, after the loss of the bravest of his troops, was forced to grant that capitulation at last, which he had refused at first. On his return home, he was seized with an illness which put an end to his life, in November, 1226, after a reign of about three years.

LEWIS IX., king of France, named *Saint*, son of the preceding, was born in 1215, and succeeded to the crown in 1226: being only in the twelfth year of his age he was placed under the guardianship of his mother, Blanche of Castile, who was nominated regent of the kingdom. Her first efforts with regard to the young king was to inspire him with a love of religion, and an attachment to the principles

ciples of pure morality. When he attained the age fit for taking upon himself the rule of the kingdom, such was the respect which he bore for his mother, that her authority remained unimpaired, and for several years they may be said to have reigned jointly. Though the piety of this prince obtained for him the title of saint, yet he knew the limits between secular and ecclesiastical jurisdictions, and was jealous of usurpations in the latter. He refused to join in the crusade recommended by pope Gregory IX., though encouraged to the undertaking by the most flattering proposals. Lewis shewed himself a good warrior by his exertions in suppressing a revolt supported by Henry III. of England: he gained two victories in person, and constrained his rival to submit to humiliating conditions of peace. Two regulations proclaim the prudence and policy of this prince. The first, under pretence of preventing strangers from inheriting lands in France to the prejudice of the natives, precluded the nobles from marrying their daughters to foreigners, and restrained them from increasing their influence by connections and alliances with the neighbouring powers. The second compelled the vassals of the crowns of France and England to make a public avowal, as to which sovereign they would do homage; and, finally, abolished the dangerous custom of adhering to either, as their caprice or interest suggested. Yet, even in this edict, the humanity of Lewis was conspicuous, and his justice indemnified those who adhered to him for the land they forfeited, by seceding from the king of England. A dangerous indisposition, which menaced the life of Lewis, was productive of a fatal vow to march in person against the infidels, whose successive victories had overwhelmed the Christians of the East: no remonstrances from his counsellors, his nobles, and even his prelates, could divert him from the resolution of fulfilling his vow. The blind zeal, however, which induced him to descend from his throne to seek the adventures of a spiritual knight-errant, did not prevent him from concerting his measures with the utmost prudence and foresight, as well with respect to the enterprise itself, as the government of the realm during the king's absence. Having entrusted the kingdom to his mother, Blanche, he prepared for his departure. "To furnish," says the historian, "an armament equal to the arduous enterprise, France was exhausted of troops and treasures; the sea was whitened with eighteen hundred sails; and nine thousand five hundred horse, and one hundred and thirty thousand foot, have been computed as the number of the martial pilgrims. The fleet, with favourable winds, reached the coast of Cyprus; the troops were disembarked on the friendly shore, and during the severity of winter, their strength was recruited and their health restored by the plenty of that island." Here it was determined to make war first upon the sultan of Egypt, for the purpose of facilitating the recovery of Palestine. In 1249, he arrived at the mouth of the Nile, and leaping into the sea, sword in hand, gained the beach, and drove away the Saracens drawn up to defend it. Damietta instantly yielded to the aggressor, but it was now found the expedition was ill-timed: the rising of the Nile prevented his farther advance, and the delay introduced disease into his army, and all the disorders naturally attendant upon idleness and the want of subordination. From this period he was no longer successful: every new attempt at conquest ended in disaster, till at length himself, his brothers who had accompanied him in the expedition, and his whole army, were under the necessity of surrendering themselves prisoners. The enemy scarcely knew any bounds to their revenge: they massacred the captives without mercy, and even treated the fallen monarch with a great degree of insolence and ri-

gour, to which it is said he submitted with firmness and dignity. The king was at length liberated, having first agreed to pay a high ransom, and to agree to a truce of ten years between the Christians and Mahometans in Egypt and Syria. This treaty was punctually executed, and so high was the honour of Lewis, that upon discovering a considerable mistake made by the Saracens in the value of the money to their own loss, he caused it to be rectified. He left the country with his queen and brothers, and carried with him about 6000 men, the sole remains of the vast army which he had collected in the outset of the business. He embarked for Palestine; and though it might have been expected, that, after his late misfortunes, he would readily have relinquished the vain hope of eastern laurels, and returned to the government of his own kingdom, yet he seemed unwilling to revisit his dominions without glory, trusting for tranquillity at home, in the vigilance and fidelity of his mother Blanche. His ambition now was to secure Jerusalem from the hollidays of the Saracens; with this view he repaired the fortifications of the places still possessed by the Christians, made pilgrimages of devotion, attempted conversions, and sunk the character of a mighty monarch into that of a superstitious crusader. News was brought him of the death of his mother, who had undergone much disquiet from various circumstances during the absence of her son, and whose grey hairs were brought with overwhelming sorrow to the grave. The king was now obliged to return, and in his passage the vessel which carried him and his family struck upon a rock, and was in the most imminent danger; nevertheless, the fortitude of the monarch was so great, that he refused to avail himself of another ship, determining to share the fate of all who were exposed to similar risks with those that threatened his own life. On his return, he was received by the acclamations of the people; his dress was plain; and his features were impressed with melancholy; the former still bore the sign of the cross, the latter evidently displayed the marks of defeat. The magnificence of the monarch was, however, beheld with admiration in his reception of Henry III. of England, who embraced the opportunity of an expedition into Gascony, to visit Paris. The splendour of his entertainment was enhanced by the courteous manners of Lewis; and the interview between the two kings was followed by a renewal of a former truce for two years longer. He began to apply himself with all diligence to the government of his kingdom, by his strict and impartial administration of justice. In the simplicity of ancient manners, he was accustomed to seat himself under a spreading oak at his castle of Vincennes, and there, in person, to decide the causes that were brought before him. He protected the lower orders from the oppressions of the great, and would not suffer his own brothers to pass over the limits of law and equity. He was extremely severe in every thing that regarded religion; and the edicts which he issued against blasphemous and impious persons, as those were called who doubted the truths of an established faith, might have been worthy of a bigotted inquisitor. So great was his character among foreign nations for equity, that he was often applied to for a settlement of disputes between kings and their nobles. The barons of England and Henry III., in their disputes, agreed to make Lewis the arbiter: his decision was favourable to the royal authority, but with a large reservation of the rights and privileges of the subject, so that, in fact, it determined nothing. He enlarged his own kingdom by the acquisition of various places on the borders of the Low Countries, and he acquiesced in the pope's donation of Naples and Sicily to Charles of Anjou, brother to Lewis. At length the zeal for propagating his religion seized again upon the mind of Lewis;

Lewis; the latent flame of enthusiasm which had been damped by his defeat in Egypt was not extinguished; and an opportunity was only wanting to revive the dormant embers. The wisdom of his regulations had restored the tranquillity of his dominions; his coffers were recruited, his finances augmented, and his hopes of success were expanded, and very sanguine. His silent preparations had been incessantly directed towards the single object of his devout ambition; the loss of Antioch provoked the more immediate execution of his designs. His example was followed by his three sons, by his nephew the count d'Artois, and by a multitude of the most gallant spirits of the court of France. He entrusted the reins of government, during his absence, to the vigilance and superintendance of Matthew, abbot of St. Denys, who derived his noble lineage from the counts of Vendome; and to Simon de Clermont, count of Nefle. A sea-port of Languedoc, near the mouth of the Rhone, was rendered a second time remarkable by the embarkation of Lewis, and the fleet of France steered immediately for the coast of Africa. An obscure king of Tunis had professed an inclination to abjure the tenets of Mahomet for those of Christ; and the vain report of an immense treasure reconciled the more interested pilgrims to the wild and visionary enterprise. But caprice or policy had already united the sly and crafty barbarian to the precepts of the Koran; and instead of a zealous proselyte, Lewis encountered an active and formidable enemy. The walls of Carthage were, indeed, stormed by the impetuous valour of the French; but their strength was exhausted before the gates of Tunis; and the warriors of the west panted beneath the sultry heats, and expired on the burning sands of Africa. The king himself was infected by the pestilential blast, and he breathed his last on the inhospitable shore, in the 44th year of his reign. In his singular character were united the virtues of the saint and the hero: his piety and equity in peace were not more conspicuous than his fortitude and valour in war. The father of his people, his heart sympathized with their miseries, and his hand was ever stretched out to relieve their distress. His excellent understanding was clouded by the fumes of enthusiasm; and the slaughter of his subjects, his own captivity, and at length his death, were the fatal consequences of a blind superstition. Pope Boniface VIII. canonized him in 1297; and his descendant, Lewis XIII., procured the day, dedicated to his honour, to be declared a general feast of the church.

Lewis X., furnished the *Boisterous*, from the rude promise of his infant years, son of Philip, was born in 1291, and succeeded his father in 1314. He, in a short time after his coronation, caused his first wife to be strangled in the prison of Chateau Gailard, where she was confined, and endeavoured to forget the vices of a licentious woman in his nuptials with Clemence, the daughter of the king of Hungary. An empty treasury delayed, for some time, the ceremonies of the coronation, and the king diligently applied himself to conciliate the jealousies and appease the discontents of his new subjects. Lewis, notwithstanding the surname which he had acquired, was of a quiet disposition, and surrendered the chief authority in the state to his uncle, Charles of Valois. The finances of the kingdom having fallen into disorder, the superintendent, Enguerand de Marigni, was made a sacrifice to the revengeful passions of the new minister. Marigni vindicated his character with vehemence; but his eloquence was of no avail, he was confined to an ignominious death on the gibbet, and his fortunes were confiscated to the use of the sovereign, and were applied to defray the expences of the coronation, which was celebrated at Rheims; and as much as they fell short of public expectation, so much

did the deficiency contribute to establish the innocence of the unfortunate superintendent. Far different supplies were necessary for the support of a war with Flanders, which Lewis was desirous of engaging in, and he accordingly proposed to raise the necessary supplies by a general enfranchisement throughout the kingdom. The inhabitants of the towns were already free, but those of the country were not so, and few were found willing to pay for that freedom which was forced upon them. The decree was, however, gone forth, and they were compelled to accept of their liberties upon the terms proposed by the sovereign, who preaced his edict with these words: "Since, according to natural right, every person ought to be free, &c." a maxim not very consistent with the compulsory purchase of liberty. The money being provided, Lewis made a campaign against de Bethune, count of Flanders, who, feeling himself unable to withstand the army brought against him, determined to bend against the storm. By the specious language of submission, he involved the king in a series of fruitless negotiations, till the season of action was passed, and the French army was obliged to retreat, without obtaining any advantage. While the king, indignant at the arts of his adversary, was meditating new projects for revenging himself upon his adversary, his designs were interrupted by death. A sudden disorder, imputed by some to poison, by others to drinking a glass of cold water when he was heated, proved fatal to him in June, 1316, after a reign of about a year and a half.

LEWIS XI. son of Charles VII. was born in 1423, and at an early age displayed considerable talents, united to a turbulent disposition. At the age of seventeen he headed a party of discontented nobles, who engaged in a petty war, which was soon suppressed, and the prince was glad to submit. After this he reinstated himself in the royal favour by his skill and valour in relieving Harfleur, invested by the English. He was soon sent with a body of troops to assist the duke of Austria against the Swiss, and obtained some advantages over them, which were succeeded by a negotiation with the Cantons, in which he concluded the first treaty between them and the crown of France. In 1446, disguised with the ascendancy of Agnes Sorel, his father's mistress, he left the court, and retired into Dauphiné, in which province he exercised the sovereign authority. He established the parliament of Grenoble, made laws, and even coined money. At length his conduct created so much uneasiness in the breast of his father, that he was determined to get possession of his person; but the prince, being made acquainted with his intention, escaped, and took refuge in the court of Philip the Good, duke of Burgundy. Here he was treated in a manner consistent with his rank; but Philip would not encourage any of his seditious projects. In the mean time the king brought back the government of Dauphiné to its ancient form, and kept a watchful eye over his son's motions: so jealous was he of his intentions, that the dread of being poisoned by his contrivance was the cause of his death. In the year 1461, Lewis received the news of his accession to the crown of France; he did not affect to conceal the joy which the intelligence excited in his breast. The competition of his younger brother, the duke of Berri, vanished at his appearance, and his own coronation was celebrated with vast magnificence at Rheims, and honoured with the presence of Philip, his noble host, and that of his son, the count of Charolois. The first emotions of the king's gratitude for the protection he had met with, was displayed in his declaring the count his lieutenant-general in Normandy, with a very munificent salary; but these marks of esteem and confidence soon vanished, and

were succeeded by an enmity between these rival princes, which only expired with life. The new king immediately dismissed the ministers of his father with disgrace, and at the same moment released from imprisonment the duke of Alençon, who had been confined for treasonable practices. With regard to foreign potentates, his conduct seemed to be destitute of every principle of justice, and dictated merely by what appeared to be the interest of the moment. In pope Pius II. he met with a politician more refined than himself, for in the hope that this pontiff would assist in replacing the house of Anjou on the throne of Naples, Lewis cancelled the pragmatic sanction of his father, which established the liberties of the Gallican church: afterwards, finding himself deceived in his expectations, he permitted its execution in certain points. Being constituted mediator in a dispute between the kings of Castile and Arragon, he had an interview with the former, in which he displayed the singularity of his disposition: for while the Spanish monarch with his attendants displayed the greatest magnificence in their apparel, he appeared in a dress of coarse cloth, with an old hat upon his head, upon which was stuck a leaden image of the Virgin. This contrast inspired them with mutual aversion, and the two kings, after a fruitless conference, returned with a thorough contempt of the forbiddens of the one and the incapacity of the other. It was a great object of his policy to reduce the formidable power of the house of Burgundy; and, in the execution of his plans, he was suspected of a plot for the seizure of the persons of the duke and his son. In return, the count of Charolois joined the duke of Brittany in caballing with his discontented nobles, and formed a confederacy, called "the league for the public good," into which the king's brother, the duke of Berri, entered. The revolted took up arms, and the count attempting to surprize Paris, an engagement took place at Monthléry, in which the victory remained undecided. Paris was, however, besieged, and the king, to avert the danger, followed the advice of Sforza, duke of Milan, which was to break the league by liberal promises, and trull to events for eluding the execution of them. He accordingly agreed to a disgraceful treaty in 1465, by which he ceded the duchy of Normandy to his brother, and granted lands out of the royal domains to others of the leaders. Some disputes between the dukes of Brittany and Normandy gave him an opportunity of recovering his power, and of divesting his brother of the dukedom of Normandy, and of that which he before possessed. The accession of the count of Charolois to the dukedom of Burgundy on the death of his father Philip, gave Lewis much uneasiness. The fiery temper of that prince, and his declared enmity to the king, involved them in perpetual hostilities. In the course of these, the king's brother, whom he had been obliged to make duke of Guienne, died, not without suspicion of poison, and the duke of Burgundy, openly accusing Lewis of fratricide, refused his arms. An invasion of France by the duke's ally, Edward IV. of England, threatened great danger; but Lewis, adhering to his favourite principle of diverting rather than confronting a storm, lavished his treasures upon English ministers and generals, and allured Edward himself by a promised pension of 50,000 crowns for life, by which means a treaty between them was concluded in 1475. The duke of Burgundy made a separate peace afterwards. Having thus extricated himself from foreign foes, Lewis indulged his severe disposition in taking vengeance on domestic traitors. The constable St. Pol, who had served under and betrayed both him and the duke of Burgundy, was brought to the scaffold, as was likewise the duke of Nemours. The cruelty of making

the innocent children of the latter nobleman stand under the scaffold, at his execution, that they might literally be sprinkled with their father's blood, inspired universal horror and general detestation of the tyrant who could devise such a deed. In 1476, Lewis was delivered from his most dangerous enemy Charles, who fell before Nanci; and he felt no scruple in making all possible advantage of this event, to the prejudice of the heirs, Charles's only daughter, Mary of Burgundy: but his attempts against her were unsuccessful, and Flanders and Artois declared for the dukes. Another scheme which Lewis meditated, was to oblige Mary to marry the young dauphin, but his hostile procedure had the effect of throwing her into the arms of Maximilian, archduke of Austria, an event which proved the fertile source of war for centuries. A war was the immediate consequence of this alliance, but mutual convenience soon brought about a suspension of arms. Lewis then turned his attention to the neighbouring states, and managed several negotiations with his wonted dexterity. He provided for the security of the family and dominions of his deceased sister, the duchess of Savoy; he supported the house of Medici against pope Sixtus IV., made an alliance with Ferdinand and Isabella, and renewed his treaty with Edward IV. One of the last public events of this reign was the union of Provence to the crown of France, by the bequest of Charles, count of Maine, the last prince of the house of Anjou. Lewis had now attained to a state of great external prosperity, was regarded throughout Europe for his power and dextrous policy, and feared by those who did not esteem him. The decline of his health, and the dread of death, filled him with jealousies and suspicions relative to his temporal authority. The nearer he approached his end, the more he clung to life; and he endeavoured, by superstitious practices, to quiet the upbraidings of a guilty conscience. He had a strong guard round his palace, who kept at a distance all visitors, except a very few, whom he permitted into his presence singly. He changed his domestics every day, sacrificed many to his suspicions, and felt more dread than he inspired. "The walls of the castle," says the historian, "were covered with iron spikes, a guard of cross bow-men watched the gates and ramparts night and day, and the guilty tyrant heard his enemies in every passing wind." Earth was in vain ransacked to revive his jaded appetites; heaven was invoked with prayers and processions to avert his impending doom; all hope was fled, and his favourite, Oliver le Dain, pronounced to him the sentence of certain and approaching dissolution; the king heard him without betraying any emotions of terror: he sent for his son Charles, and employed his last moments in advising him to cherish the princes of the blood; to govern by the counsels of his nobles; to maintain the established laws of the kingdom; and to diminish the extraordinary imposts with which he had burdened his subjects. This last effort exhausted the strength of the fainting monarch, and he died, after a reign of twenty-three years, in August 1483. Dreaded by his subjects, whom he had continually oppressed, and detested by his neighbours, whom he had assiduously deceived, he yet obtained from the obsequious temper of the representative of St. Peter, the title of Christian King, a title that was ever after held by his successors. He instituted the order of St. Michael. He was author of several useful establishments, and the administration of justice was generally pure where he himself was not concerned.

LEWIS XII., son of Charles, duke of Orleans, descended from Charles V., was born in 1462: he married Joan, daughter of Lewis XI., and at the death of that monarch, in 1483, and the accession of Charles VIII. he stood as presumptive heir of the crown, with the title of duke of Orleans.

leans. On the death of Charles, in 1498, he succeeded to the crown without opposition. Among the very earliest efforts of his reign were his attempts to diminish the taxes levied upon the people. He is also celebrated at this period for the well known sentiment with which he quieted the apprehensions of his enemies. "It is," said he, "not for the king of France to revenge the injuries done to the duke of Orleans." Turning his attention to the duties of his new station, he introduced various reforms into the civil administration and military discipline, exhibiting at the same time a steady mind in every thing which he undertook. He was anxious to obtain a divorce from his wife, the daughter of Lewis XI., because, being deformed, she was not likely to bring him any children, and also, because he wished to espouse Anne of Brittany, widow of the late king, who had refused her duchy. The pope, Alexander VI., was ready to favour him on this occasion, in order that, in return, he might obtain an establishment for his natural son, Cæsar Borgia. On the oath of the king of France, that he had never consummated the marriage, the holy pontiff declared the union void and illegal. Jane submitted with decent resignation to a sentence which deprived her of a crown, retiring to a nunnery, in which she took the veil, and closed a life of humble virtue; and, in January 1499, he was married to Anne of Brittany. The queen, though willing to ascend the throne of France, was anxious to secure the independence of her native duchy, and stipulated, that if their union should be productive of two sons, the younger should inherit Brittany, with all the prerogatives of its former princes. This agreement proved ineffected, by her having no son, and by the marriage of her eldest daughter Claude to Francis, count D'Angoulême, who afterwards ascended the throne. The claims of Lewis upon the Milanese, and the kingdom of Naples, now began to excite in his breast the ambition of conquest; he accordingly made an alliance with the Venetians, and, in conjunction with them, invaded the dominions of Ludovico Sforza, duke of Milan. The French generals, in the short space of three weeks, made themselves masters of Milan, Genoa, and all the strong places in the country: Lewis entered Milan in triumph, while Sforza retired with his family and treasures to Inspruck. A sudden revolution caused the expulsion of the French, and the return of the duke, but the troops of Lewis shortly entered the Milanese, and got possession of the person of the duke, who was sent into France, where he died. Lewis now made a treaty with Ferdinand of Arragon, for the partition of the kingdom of Naples between them. In 1501 this plan was successfully executed, and Frederic, king of Naples, expelled from his dominions, put himself into the hands of Lewis, as the most generous of his two enemies. Ferdinand was not content with a part of the conquest, but took every method to secure to himself the whole spoils; and by means of his famous captain, Gonsalvo de Cordova, obtained possession, in 1503, of the whole kingdom of Naples, after defeating the French at Seminara and Cerignole. It was on this occasion that Gonsalvo got possession of the young prince, whom he conveyed to the king of Arragon, and though treated with lenity, he was for fifty years the captive of the court of Spain, till Death, that last friend to captives, extinguished in him the Arragonese line of Neapolitan kings. In the year 1507, a revolt of Genoa called Lewis, in person, into Italy with a powerful army; he entered it as a conqueror, seemingly bent on vengeance, but his natural clemency was displayed in a moderate chastisement which he inflicted upon it. In the following year he joined the famous league of Cambray against the Venetians, formed by the temporary union of powers

mutually jealous of each other, and opposite in interests. Lewis became a party in the league through the influence of cardinal d'Amboise. He even marched at the head of his army, and, in May 1509, gained a complete victory at Aignadel, which reduced the republic of Venice almost to ruin. Its safety arose from that disunion which might be expected in a league formed of such discordant materials. Pope Julius II. who had chiefly contributed to its formation, resolved, after the purposes of his own ambition were answered, to employ all his efforts to expel the foreign powers from Italy. With this view he made peace with the Venetians, and openly declared war against the French. A new league was now formed, of which Julius was the chief mover: he attacked in person the duke of Ferrara, its ally, and excommunicated the council of Pisa, which had been assembled under the auspices of Lewis and the emperor. The military reputation of the French was ably supported by the duke of Nemours, who, in 1512, gained the battle of Ravenna, but fell in a rash pursuit of the enemy. The king, his uncle, was deeply affected by the loss of him, and of many other brave men; and deprecated a victory purchased so dearly. In a short time after this, the Swiss overran the Milanese, and the French were expelled. It was again recovered, and again lost. At this period Henry VIII. of England joined the papal league, invaded Picardy, and routed the French in an action, since denominated the battle of the Spurs. Henry pursued his career of success, which was interrupted by the retreat of the Swiss and the desertion of his allies; he determined, therefore, to repass the seas with the greater part of his army, ill compensated for the expence with which it had been attended. In 1514 the queen died, and he proposed marriage to Mary, sister of Henry VIII.: his offers were accepted, and a league offensive and defensive was formed between the two kings. Lewis, however, was obliged to purchase this alliance with a great sum of money, instead of receiving a portion with his wife. It was agreed that Henry should receive the payment of a million of crowns, being the arrears due by treaty to his father and himself; and that the princess Mary should bring four hundred thousand crowns as her portion, and enjoy as large a jointure as any queen of France. Lewis also agreed that Tournay should remain in the hands of the English; and that Richard de la Pole, an exile in France, who affected to revive the pretensions of the house of York, should be banished.

The new queen, being young and beautiful, was welcomed with universal acclamations by the people; who rejoiced in an alliance that converted a formidable enemy into an important friend. In the midst of festivities given on account of the marriage, formidable preparations were made for renewing the war in Italy; but his designs were broken. He had often repeated the adage, that "love is the king of youth, but the tyrant of old age," and he was now condemned to experience its truth. His constitution, already shaken, was exhausted by his affection for Mary, with whose beauty, grace, and numerous accomplishments he was enchanted. He died within three months of his marriage by a disorder of debility, in the seventeenth year of his reign, and the fifty-fourth of his age. The character of this prince was distinguished by a superior integrity, seldom to be discerned in princes; and though sometimes the dupe of his goodness of heart, and often of the treachery of his neighbours, yet he well deserved the appellation of "the father of his people." In him expired the elder branch of the house of Orleans, and the sceptre of France was transferred to that of Angoulême.

"History," says the biographer, "has taken pleasure in recording, that when, according to the usual custom, the criers announced his death, it was done in these words, 'the good king Lewis, the father of his people, is dead.'" He was naturally inclined to economy: this was once made a topic of ridicule in his presence, to which he replied, "I had rather see my courtiers laugh at my avarice, than my people weep at my extravagance." In his manners and conversation, Lewis was affable, mild, and cheerful, prone to fallies of innocent pleasantry, and fond of literature. He assembled men of learning at his court, and employed them in public affairs. Greek was first taught at the French universities in his reign.

LEWIS XIII., son of Henry IV., by Mary de Medicis, succeeded to the throne in 1610, under the regency of his mother, being only in the thirteenth year of his age. He was declared in his majority in the year 1614, and soon after the states-general were convoked. At the meetings of this assembly many abuses were discussed, and some few were remedied. During the minority of the king, France had been, on account of the mal-administration of the queen, a scene of faction and civil commotions: these troubles continued, and were greatly aggravated by a religious war. Lewis's character, as it opened, displayed that propensity to be governed, which indicates weakness of mind, together with much coldness and indifference. The great duke of Sully, inflexible in his plans, confiding in the integrity of his own heart, and disdainful the arts of courts, found that sincerity, which had been esteemed by Henry, no longer acceptable; he indignantly retired to the estates which he had purchased through the bounty of the late king, and resigned his offices. Every day now revealed the ascendancy of Concini, who endeavoured to remove from the eyes of the people the unpopular circumstance of foreign birth, by assuming the title of marquis d'Ancre. During the administration of this favourite, the annals of France, as they respect the internal affairs of the country, present a dreary prospect of uninteresting anarchy and barren discord. The princes of the blood, insatiate of power, and the nobles turbulent and discontented, repeatedly erected the standard of revolt against the regal authority; as frequently, with contemptible levity, they courted the returning friendship of the crown, whose timid counsels were content to soothe, without presuming to repress, their capricious arrogance. Amidst these hostilities at home the king concluded his marriage, and received at Bourdeaux the hand of Anne, the infanta of Spain. Immediately after the celebration of that ceremony, Lewis marched at the head of his army with the view of reducing the prince of Conde, in order that he might impress his subjects with favourable sentiments of his courage and activity. The approach of winter suspended the operations of the contending parties, who, while they rejected all terms of accommodation, seemed studious, in every enterprize, to avoid the effusion of blood. With the return of spring the royal forces were again assembled, and were again led on by the presence of their sovereign; but much was the surprize of his subjects to learn the intelligence that the king had subscribed a peace, and submitted to the demands of those princes whom he had solately declared traitors to his throne. In 1617, Concini was murdered in the Louvre, at the instigation of Luynes, whom he had introduced to the king, and who now superseded him in the royal favour. The principal events which occurred in this reign during the administration of Luynes, were quarrels with the queen-mother, and a renewed war with the Calvinists, who were headed by the duke de Rohan. During this war Luynes died, and the Calvinists obtained an advantageous peace.

In 1624, cardinal Richelieu, who, while bishop of Luçon, had been gradually rising to political reputation, acquired the chief management of affairs, which he held with untroubled sway so long as he lived. This great minister found a very difficult task before him, owing to the weakness of the king, the selfish ambition of the nobles, and the prevalence of different factions. War broke out again with the Calvinists, who complained that the conditions of a former treaty had not been observed. The sovereign appeared in arms, but the chief honour was due to Richelieu, who, after a long siege, took Rochelle, by means of a vast dyke thrown across the harbour to cut off supplies by sea. This important conquest was the means of reducing the party to civil obedience, and, to the honour of the victor, they were still allowed a good share of religious liberty. In addition to the civil contentions, a war with Spain broke out in 1635, which was at first unsuccessful on the part of France; but at length the Spaniards were reduced to sue for peace. In the mean time the spirit of Richelieu's domestic administration was highly arbitrary, and the king displayed great harshness in his addresses to the parliament. The last of his favourites was Cinqmars, who was recommended to the monarch by his minister, but who was led by his ambition to cabal against his friend and patron. His ruin was the consequence, and Lewis gave him up to execution with the most perfect indifference. (See CINQMARS.) On the morning of the execution of this man, intelligence was brought of the surrender of Perpignan, and the total discomfiture of the enemy, of which facts the minister apprised the king in a single and very short sentence, "Your troops are in Perpignan, and your enemies in their graves." Immediately after these events, Mary de Medicis closed a wretched life, reduced to the utmost indigence, at Cologne. The filial affection which Lewis denied to her while living, was revived on the news of her death; but the attention of France was now completely engrossed by the approaching dissolution of him, whose daring counsels had driven her into banishment. The glories and life of Richelieu drew near their end; after the reduction of Perpignan, exhausted in body, but still vigorous in mind, he had approached the capital by slow and triumphant journeys; his last moments attested his ascendancy over the sovereign. On his death-bed he protested to Lewis, that his counsels had ever been directed to the honour of the crown and the welfare of the kingdom. (See RICHELIEU.) From the death of this minister, Lewis aspired to hold the reins of government for himself: the war was prosecuted with diligence, vigour, and success, and the spirit of Richelieu seemed still to impel the machine which his genius had set in motion. But victory could not check the progress of disease, and Lewis was sensible that the inevitable moment was rapidly approaching when his life and reign must terminate together. A slow fever had already worn him to a skeleton, and he prepared to meet with firmness and composure the last scene of human greatness. "When," says the historian, "his physician, at his earnest desire, numbered the fleeting minutes that remained, and pronounced that his life could not exceed two or three hours; he received the intelligence with resignation, and even satisfaction; and looking fervently up to heaven, added, 'Well! I consent with all my heart.'" The prediction was strictly verified by the event, and he expired in the forty-second year of his age, and in the thirty-third of his reign. In estimating his character; he was devout, but his devotion shewed itself in minute observances and submission to his confessors. He was not greatly addicted to pleasure, and the mistresses on whom he bestowed his favours, were rather the objects of his jealousy than

than of his love. He had a share of judgment and solid sense, and did not want decision. In the administration of justice, he was inclined to rigour, and thence acquired the epithet of "The Just;" though it must be admitted that his administration of justice was frequently impeached by his severity, and sometimes by his cruelty.

LEWIS XIV., son of the preceding, was born in 1638, and succeeded to the crown, under the regency of his mother, Anne of Austria, on the death of his father in 1643. She soon resigned herself to the influence of cardinal Mazarin, who had succeeded Richelieu in the last reign. In the early part of this reign, the kingdom was involved in a bloody and extensive war with the house of Austria. The peace of Munster, in 1648, relieved France from the greater of her foreign foes; but it was soon succeeded by the civil war of the Fronde, during which the royal family was obliged to leave the capital, and wander as fugitives from province to province. The education of the young king was much neglected, and he was left ignorant of the points of knowledge most useful and reputable to a prince. The more valuable part of his reading was the tragedies of Corneille, which improved his taste, and gave him ideas of true grandeur; but the want of solid instruction, moral and literary, marked his character through life. The lesson most strongly impressed on his mind in his very childhood, was the sentiment of his own importance, which, though it led him to adopt a dignified propriety of conduct, nourished in him that pride and vanity, and that impatience of controul, which were the leading features of his reign. Taught by flatterers that he himself was every thing, and that his subjects were nothing in the comparison; he was habituated to think no sacrifice of their's too great for the promotion of his glory and the gratification of his desires. The convulsions of the state had not ceased when Lewis XIV. had attained the age fixed for his assuming the reins of government, and his majority was solemnly declared in parliament; but he was still in leading-strings, influenced wholly by the counsels of his mother, and he seemed to inherit her fond partiality for Mazarin, though he was shortly after, by the instigation of his parliament, obliged to give him up, and suffer him to retire into exile. No sooner was it known that Mazarin had left the city of Paris, than the king was welcomed by the inhabitants with the loudest acclamations, and he found himself freed from the clamorous importunities of a discontented parliament, and firmly fixed on his throne. Scarcely, however, was he expelled by the general voice of the nation, and by the royal declaration, than he was recalled by the king, and, to his own infinite surprize, entered Paris once more in full power, and without the least disturbance. The king received him as a father, and the people as a master; but the cardinal, amidst the satisfaction of this change, could not repress his contempt of the national levity. The minister applied himself with vigour to extinguish the sparks of revolt; and, in 1653, the war of the Fronde was terminated with his complete triumph. Condé, who had joined the Spaniards, continued to maintain a kind of civil war on the frontiers, where he was held in check by his rival in glory, the great marshal Turenne. In 1659, the peace of the Pyrenées advantageously concluded the long quarrel with Spain. One of its conditions was the marriage of the king with the infanta Maria Theresa, which took place in 1660. The king, during the life of Mazarin, interfered very little in public affairs; but after his death, in 1661, Lewis began to govern for himself, and from that moment the post of prime minister became vacant: he had, however, able men about him; among these was Colbert, who had been recommended to him by

Mazarin, as a most able financier. To his genius was owing the revival of commerce and the marine, and all the splendid establishments of arts and manufactures which adorned the early part of this reign. It was he who, though not learned himself, was capable of appreciating the true value of literature, and suggested to the king, his master, that plan of pensioning all the eminent men of letters throughout Europe, which, at a comparatively small expence, secured to him more adulation from persons of real learning, than any prince of modern times. His leading object was personal grandeur. In whatever point any other prince had attained to greatness, he was resolved to emulate him. He employed all the resources of a rich and flourishing country to surpass every competitor, in whatever could conduce to his glory. This spirit led him to attempt many great and useful projects, but for want of limit and moderation, it defeated its own purposes, and exhausted its means before it had attained its end. The age of Lewis XIV. was that in which the reputation of France for arms, arts, literature, and magnificence, stood at its highest pitch; at the same time, it was that which demonstrated its wretchedness and humiliation, and the impartial historian has held up the king rather as the squanderer of his country's prosperity, than as the author of it. Of the wars of this monarch we cannot pretend to give a detailed account; the most that this article will allow will be a sketch of the principal events of the reign, as connected with the personal character of the king. A quarrel concerning the precedence between the French and Spanish ambassadors at London, gave occasion to Lewis to assert in such high terms the superiority of his crown, that the point was never after contested. Shortly after, the insolence of the French ambassador's servants at Rome, having brought upon them an attack from the pope's Corsican guard, in which some were killed, and the French quarters violated, the king seized upon Avignon, and obliged the pope's nephew, a cardinal, to come to Paris and ask pardon; the Corsican guard was broke, and a column was erected in Rome as a memorial of the event. War with Spain was renewed in 1667; the king in person took the field, though the measures of the campaign were probably directed entirely by the great Turenne. The whole of Flanders was reduced in this campaign, and at the close of it Franche Comté was conquered. A triple alliance between England, Holland, and Sweden, checked the progress of the French arms, and produced the peace of Aix-la-Chapelle in 1668. In 1672 Lewis, with a vast army, commanded by the ablest generals, burst upon the provinces of Holland; and Amsterdam, the capital, was rescued from his grasp only by laying the surrounding country under water. At this juncture, William, prince of Orange, raised to the office of stadtholder, revived the drooping spirits of his countrymen; and the principal potentates of Europe, alarmed at the success and ambition of France, leagued against her. Holland was now evacuated as fast as it had been over-run. The French arms were again turned upon Franche Comté; it was conquered a second time, and became inseparably annexed to the crown of France. War with Spain, the empire, and other powers, continued some years longer, but it was terminated, in 1678, by the peace of Nimeguen. Lewis, attended by all the pomp and luxury of a court, formed several sieges in person; he carried with him historiographers to record his exploits, and every art was employed to exalt him in his own estimation, and in the eyes of Europe. He received from his subjects the title of "Le Grand," which for a considerable time seemed durably attached to his name; but he lived to lose it in the estimation of foreigners, and it has, by the events of the last twenty years, finally become obsolete among his own countrymen.

countrymen. The peace of Nimeguen did not terminate the projects of Lewis XIV. ; he attacked, and brought to submission, the piratical states of Algiers, Tripoly, and Tunis ; and next, upon very trifling grounds of offence, made war upon Genoa, and forced the doge to come in person and ask pardon of the king. With pope Innocent XI. he quarrelled respecting the supposed rights of the Roman church, and because he insisted upon retaining the franchises of ambassadors from Rome, which other powers had agreed to renounce, as inconsistent with a safe and regular police. On this occasion Lewis declared to the nuncio, "that he would never take the example of others as the rule of his conduct, but that it was for him to give the example." He was now ambitious of the fame that would attach to the extirpation of heresy from his kingdom. Calvinism, in France, since the victory over it by Richelieu, had become a peaceful separation from the national church, and its sectaries were useful citizens chiefly attached to manufactures and commerce. Lewis, animated by a spirit of intolerance and bigotry, undertook to put an end to it. The privileges of the Protestants were openly violated ; missionaries were sent for their conversion, supported by dragoons ; and severities were exercised, which excited the horror and indignation of all the reformed states of Europe. In 1685 the revocation of the edict of Nantes, first granted by Henry IV. and confirmed by Lewis XIII. deprived the Protestants of all exercise of their religion, and tore from them their children to be educated Catholics. The tyrant at the same time issued his decrees against emigration, and placed guards on his coast ; nevertheless vast numbers escaped from his machinations, and carried their arts and industry to foreign and hostile nations. Lewis, though a pretended votary to religion, and a zealous son of the church, was not free from that licentiousness which is regarded as highly culpable by persons of real and unaffected piety. Several mistresses, in succession, enjoyed his favours ; with one of whom, madame de Montespan, a married woman, he lived a long time, in the most open manner, and indulging her haughty and capricious humour. Her influence declined with her personal charms, and the king's advancing years ; and she was superseded by the widow Scarron, elevated from that low condition to the title of madame de Maintenon, a person who, by the powers of her understanding, and consummate skill in the art of pleasing, obtained a complete ascendancy over the king's mind. On the death of the queen he privately married her, but she was never acknowledged as queen. The league of Aunbourg, formed in 1687, between the emperor and most of the German princes, the king of Spain, the United Provinces, the duke of Savoy, and other Italian potentates, had for its object the reduction of the power of France. The great leader in this league was William, prince of Orange, who, when he ascended the throne of England, contrived to add that kingdom to the confederacy. The forces of France had proved victorious in many quarters ; marshal Luxembourg, and other eminent generals, renewed the successes of the former war, and the king in person took Namur. The defeat at La Hogue was, however, a fatal blow to the French marine ; the finances of the country began to be depressed, a circumstance that led to much domestic distress, and Lewis XIV. was obliged, in the midst of victory, to sign the general peace of Ryfwick in 1697. The declining health of Charles II. king of Spain, who was without heirs, became a subject of universal interest with respect to the disposal of his vast inheritance ; and Lewis, fearing lest it should fall into the hands of the house of Austria, joined England and Holland in a scheme for the partition of the Spanish dominions. At length, however, the dying king

made his will, appointing, as his general heir, Philip, duke of Anjou, second grandson of Lewis. The wary monarch foresaw the danger of accepting the legacy, but was decided by a regard for the glory of his house, and the wish of uniting the interests of two great monarchies, which had generally been at variance. The hopes of the king have been completely disappointed, and every attempt to form an union of interest and affection between two nations radically opposite in character and circumstances, has been baffled. Neither the intrigues nor the power of the present emperor of France have, at present, been able to effect that which was unquestionably an object near the heart of Lewis XIV.

The jealousy excited in England and Holland by this accession to the influence of France, was converted into open hostility by the imprudence of Lewis in declaring the son of James II., king of England, at the decease of his father in 1701. This step, contrary to the unanimous advice of his council, and his own judgment, was taken in consequence of a generous emotion of pity for the family of his royal friend, enforced by the sollicitations of madame de Maintenon ; it was not only impolitic, but, in fact, it amounted to a declaration of war, because an article in the peace of Ryfwick, explicitly acknowledges William's title to the crown of England. A new league was immediately formed between the maritime powers and the emperor of France ; and the death of king William, during the preparations for war, did not prevent its being carried into execution under his successor queen Anne. From this period to the year 1711, the reign of Lewis was one continued series of defeats and calamities ; and he had the mortification of seeing those places taken from him, which, in the former part of his reign, had been acquired at the expence of many thousand lives. The domestic misery of Lewis had kept pace with the public calamities ; the court, the splendour and magnificent entertainments of which had excited the admiration and envy of Europe, had long been impressed with a deep and settled gloom. The art of forgery, in Europe, was yet feeble and crude ; a fitula, with which the king was attacked, spread a general alarm ; and though the operation was successfully performed, yet he never recovered his accustomed spirits, but led a more serious and retired life, and chiefly devoted his hours to the conversation of madame de Maintenon, whose influence increased with his years. To his own private afflictions were added many family losses. The death of the king's only son, which happened in 1712 ; the duke of Burgundy, the duchess his wife, and their eldest son, all swept away within a few months, and laid in the same tomb ; the only surviving child at the point of death ; these private woes, added to those of the public, mark the close of the reign of Lewis, as an era of calamity ; and a wretched people, who conceived that their own happiness was concerned in the glory of the king, awaited in silence to behold the former greatness of their monarch extinguished by the dark cloud of misery which obscured his setting sun. Another mortification remained for the king ; he had enlarged the canal of Mardyke, and formed an harbour there, equal, it was thought, to that of Dunkirk. The ambassador for England remonstrated against this evasion of the treaty of Utrecht, and Lewis was under the necessity of discontinuing the works. At the age of seventy-seven, that vanity and ambition which had agitated the years of manhood were nearly extinguished. He coolly listened to the sollicitations of the unfortunate James, who aspired to ascend the throne of his late sister, queen Anne, already filled by the elector of Hanover, under the title of George I. To the importunities of the prince he granted a small supply of money, and a vessel fitted out in the name of an individual ; but while

that enterprize hung in suspense, Lewis was seized with a mortal disease which soon brought him to the grave. In his last hours he displayed a greatness of mind worthy of his exalted situation. "Why do you weep," said he to one of his domestics, "did you think me immortal?" His fortitude was tempered with humility; he recollected his own weakness, and had sufficient magnanimity to confess them; his advice to the infant that was to succeed him was to avoid that glory which he had hoped to attain by war, and to consider the happiness of the people as the principal object of his government. To madame de Maintenon he left no fixed stipend, but contented himself with recommending her to the care of the duke of Orleans. She retired to St. Cyr, which had been founded, at her persuasion, for the education of young ladies, and demanded but little more than *zooool. per annum* during her life; this was regularly paid till her death, which happened in about four years. Lewis XIV. had the misfortune of outliving his popularity, and an indecent joy was manifested by the people at his funeral. As a monarch he had none of the commanding qualities which create a nation or an era, and would scarcely have been distinguished from common princes under common circumstances. The masculine beauty of his person was embellished with a noble air; the dignity of his behaviour was tempered with the highest affability and politeness; elegant without effeminacy; addicted to pleasure without neglecting business; decent in his vices, and beloved though invested with arbitrary power. Nevertheless his qualities seemed those that rather attract a momentary regard, than command a permanent esteem. The talents, the fire of the statesman, and the hero were still wanting; vanity rather prompted him to insult, than ambition to enslave his neighbours. Though he frequently took the field, and reduced countries and the strongest towns, yet in all his campaigns he never exposed his life to the hazard of a battle. The age of Lewis XIV. will always be a memorable period in his country and of Europe. His own intellectual acquisitions were very limited, but he was the patron of learning and science.

LEWIS XV., son of the duke of Burgundy, (grandson of Lewis XIV.) was born at Versailles in 1710, and succeeded to the crown on the death of his great grandfather, when he was but five years of age. By the last will of Lewis XIV., a council of regency was appointed during the minority of the young king, at the head of which was the duke of Orleans. That nobleman, however, disgusted with an appointment which gave him only a casting vote, appealed to the parliament of Paris, who set aside the will of the late king, and declared the duke sole regent. His first acts were extremely popular, and gave the most favourable ideas of his government and character. He restored to the parliament the right which had been taken from them, of remonstrating against the edicts of the crown; and compelled those, who had enriched themselves during the calamities of the former reign, to restore their wealth. The young king was placed under the tutelage of Fleury, bishop of Frejus, afterwards cardinal, who, by his insinuating and very gentle manners, acquired his affection and esteem. His minority ended in 1722, and he was solemnly crowned; but the regent retained his chief power during another year. He now resigned his high office as prime minister to the duke of Bourbon, who negotiated a marriage between the king and Maria Leczinski, daughter of Stanislaus, king of Poland, which took place in 1725. Shortly after this, Fleury became prime minister; which post, notwithstanding his great age, he held till his death in 1743. The spirit of his government was economical and pacific; and a war with the empire, in 1733, was the principal foreign occurrence.

This terminated in the annexation of Lorraine and Bar to the crown of France. Lewis lived for some years in conjugal affection and fidelity with his queen, by whom he had one son and several daughters. At length, however, he was captivated by the allurements of some ladies of the court, and received, it is said, the favours of three filters at the same period: and from this time he indulged his propensities for the female sex without moderation and delicacy. On the death of the emperor Charles VI. in 1740, a new continental war was excited. France joined with Prussia and Poland, in raising to the empire the elector of Bavaria, in opposition to the interests of the house of Austria, whose cause was maintained by England, Holland, and Sardinia. In 1744 Lewis took the field in person, and was at the reduction of several strong places; but at Metz he was attacked with a dangerous illness, which occasioned a general conflagration through France. His recovery was celebrated with all those transports of joy which could proceed from the awakened sensibility of a nation, then remarkable for an enthusiastic attachment to its sovereigns. The surname of "Well-beloved" was given to the king on this occasion; and, in return for the affection of his people, he displayed the feelings of a good heart, and exclaimed very sincerely, as well as very naturally, "How sweet is it to be thus loved! What have I done to deserve it?" Soon after his recovery, he beheld at a distance the bloody battle of Fontenoy, gained by marshal Saxe. The French were generally successful in Austria and the Dutch Netherlands, but were defeated in Italy; and their marine was totally ruined by the English. The treaty of Aix-la-Chapelle, in 1748, restored peace to Europe: and, as far as the exhausted finances of France would allow, useful plans of domestic improvement were executed; and the most splendid establishment of the reign, the royal military school, was instituted in the year 1751. About this time, some warmly contested disputes between the magistracy and clergy occasioned the interference of the king, who, instead of making a firm decision between the contending parties, upon principles of justice and true policy, acted the part of a despot, by alternately banishing both. It was in consequence of the ferment produced by these quarrels, that a fanatic, named Damien, was induced, in 1757, to attempt the life of the king at Versailles, in the midst of his guard. He received a slight stab between his ribs. Damien was evidently insane: he was instantly seized by the soldiery, and put to the rack, in which he endured the most exquisite tortures that the wit of the most savage hearts could invent. In the midst of these he persisted in an obstinate manner to declare, that he had no intention to take away the life of the king: his only object was to wound him, that Almighty God might by that means affect his heart, and thereby incline him to restore peace to his dominions. These expressions had no weight with his merciless tormentors, who consigned him to the most terrible death which they could devise. This circumstance had probably some effect on the king himself; for he soon after banished the archbishop of Paris, and accommodated matters with his parliament. The war of 1755 had brought the nation to the brink of ruin, when Lewis implored the assistance of Spain; and on this occasion the celebrated "Family Compact" was signed, by which, with the single exception of the American trade; the subjects of France and Spain were naturalized in both countries, and the enemy of one sovereign was to be invariably regarded as the enemy of the other. At that time, the accession of Spain to her cause only added new laurels and acquisitions to Great Britain. Lewis's attachment to a selfish and imperious mistress, madame de Pompadour, who

was allowed to appoint and dismiss ministers and commanders at her pleasure, and sacrificed every thing to her avarice and ambition, was greatly instrumental in producing the disasters which followed one another at this period in rapid succession. The conclusion of the seven years' war, in 1763, gave the nation repose, but not without a considerable diminution of territory; and in the following year, the society of Jesuits, as celebrated for their great learning as famous for their unbounded intrigues, was abolished in France. The death of madame de Pompadour did not free the king from female influence, who by this time had incurred all the habits of a confirmed debauchee. He fell under the dominion of madame de Barré, who, by her dissolute arts, provoked his languishing desires; and his latter years, as might have been anticipated by the conduct of the former part of his life, was disgraced by the grossest sensuality. At the same time, the government became more severe and arbitrary. Though the arms of Lewis had extinguished the flame of freedom in Corsica, in France it was revived by the breath of the parliaments, and cherished with a fond regard that threatened the most important consequences. An edict issued by the king, which transferred some new and extraordinary powers to the grand council, was strenuously opposed by the parliament of Paris. Sixty-four members of that assembly voted for utterly abolishing that council; and the question was lost by a majority of two, though all the princes of the blood attended to support the court; and the duke de Choiseul endeavoured to overawe the independent spirit of the patriotic party, by continuing in the assembly throughout the debate. The minister, finding his exertions in the support of despotism of no avail, attempted to conciliate those whom he had vainly endeavoured to intimidate. Hitherto the sovereign had resisted the solicitation of the people to restore the parliament of Brittany: he now aspired to popularity, by doing of his own accord that which he had been frequently impetioned to grant; and the duke de Duras was sent into that province to re-establish the parliament, and to recall the members from exile. But concession, which a short time before would have been ascribed to the benignity of the monarch, was now attributed to his fears; and the parliament had scarcely assembled before they convinced their countrymen, that oppression had confirmed, and not extinguished their zeal for the public welfare. The province of Brittany had long groaned under the iron rule of the duke d'Aiguillon; who for four years had persecuted with unremitting vengeance M. de Chalotais, the attorney-general to the parliament. That unfortunate gentleman had opposed, with the indignation of a virtuous magistrate, the oppressive measures of the duke; he was therefore driven into exile, and pursued from dungeon to dungeon, till at length a sentence was procured against him that would have involved his life, and which his cruel persecutor was hastening privately to carry into execution. The parliament of Brittany interfered, and prevented the perpetration of so foul a deed. The rescue of M. de Chalotais laid open a scene of the blackest iniquity; and the parliament of the province, possessed of new proofs, commenced a process against the duke d'Aiguillon, whose trial was conducted in the presence of the king, the princes of the blood, the peers, and the parliament of Paris. Before so high a court thus specially assembled, the written proceedings carried on against M. de Chalotais were produced, and disclosed such a complicated system of guilt and cruelty as exceeded every thing that could have been imagined. Amidst these domestic disquietudes, the dauphin, afterwards Lewis XVI., received the hand of Maria Antoniette, sister to the emperor of Germany. The crowd that eagerly pressed forward

to be spectators of the fire-works, displayed on this occasion, was so great, and the confusion that prevailed was so completely overwhelming, that several hundred persons perished, by being literally trampled to death. This loss, however, which was felt in one way or other by almost all the families of Paris, did not divert the public attention from the prosecution of the duke d'Aiguillon. But at the moment that the nation was expecting, with the most earnest solicitude, the decision of this most important cause, Lewis thought proper, by a violent exertion of his power, to put a stop to the whole course of justice, and to all farther inquiries into the conduct of the duke. All the parliaments of the kingdom made a common cause: the ordinary course of justice was suspended; and, in conclusion, the king, in 1771, overthrew the whole system of judicial administration, and established a new one. This was not effected but with force. The language of the parliament of Paris was worthy the indignant feelings of free men: "Your edict, sire," say they, "is destructive of all law: your parliament is sworn to maintain the law; and the law perishing, they should perish with it: these, sire, are the last words of your parliament." Lewis, unaccustomed to such language, prepared to support his authority by the most violent measures. In the dead of the night, the members were roused from their slumbers by parties of the guards sent into each house, who presented to every individual a lettre de cachet, which enjoined them to declare whether they would resume the administration of justice. In the moment of confusion, several of them were surprised into acquiescence; yet they soon retracted, and, in the end, the whole body of parliament was banished the capital. Here then was the foundation of that revolution, which must be touched upon in the next reign, and which has introduced such scenes into the political world which the wildest imagination could not have conceived. The exhausted state of the finances suggested new and burdensome imposts on the great body of the people, which augmented the public discontents. In the midst of these, Lewis found no solace even in the company of his mistress madame de Barré: her beauty proved insufficient to excite desire; and he became discontented with himself, and with all about him. A succession of mistresses became necessary to rouse the languid appetites of the king. One of these, who was infected with the small-pox, communicated the disease to the king, who in a short time died of it, unpitied and unlamented, May 1774, in the sixtieth year of his reign. He had lost his only son in 1765, and his crown devolved upon his grandson.

Such was the fate of Lewis XV., who at length fell a victim to those sensual appetites, in the gratification of which he had sacrificed his own fame, and the welfare of his subjects. The enviable appellation of *well-loved*, which he was conscious, as we have seen, he had not merited, but which had been conferred in the moment of danger by a loyal and affectionate people, was completely obliterated from memory, by 30 years of lascivious excess, profusion, and rapacity: his example had loosened the bands of morality; his prodigality had exhausted the credit and resources of his country; and his wanton pride had trampled upon every form that had been held sacred in the constitution. His affections seemed to have been confined within the narrow limits of his personal pleasures and security. It was by the perpetual suggestions of the countess de Barré, that his safety was at stake, which stimulated him to decisive measures in suppressing the parliaments of France. Though concealed from the public eye, the embers of freedom were still carefully cherished, and, as will be seen in due time, burst forth with accumulated force, and overwhelmed

wheimed the throne of despotism. During this reign the arts and sciences made a rapid progress in France, which was aided by the munificence of the court, as long as other demands did not anticipate the funds for this purpose. The voyages of the French mathematicians to the equatorial and polar regions, in order to measure a degree of the meridian, were equally honourable to the government and the persons employed. The king was deeply read in history and geography. As a gentleman he was polite, affable, and naturally mild and humane; but fondness for sensual indulgence degraded him as a king and a man.

Lewis XVI. grandson of the preceding, and son of the dauphin, Lewis, and of Maria Josepha of Saxony, was born in August, 1754. His father carefully superintended the education of his three sons, and placed them under the direction of preceptors, who were particularly attentive to their morals, and who instilled into their minds sound principles. With respect to the subject of the present article their cares perfectly succeeded; he, whose title at that time was the duke of Berry, was naturally modest, timid, and docile, and repaid, by his virtues, the attention bestowed upon him. In his earliest years, though he did not manifest any brilliancy of parts, he shewed a disposition capable of attaining useful knowledge, and manifested a memory retentive of the minutest facts. He had a sound judgment, great patience and application. He ascended the throne in 1774, being then in the 20th year of his age, and, to secure himself against the dire effects of that disease, which had proved fatal to his predecessor, submitted to inoculation, with several others of the royal family. Their quick and easy recovery contributed much to extend the practice throughout the kingdom. The king, as soon as he had gained his health, applied himself diligently to extinguish the differences which had taken place betwixt his predecessor and the people. He removed those from their employments, who had given cause of complaint by their oppressions; and he conciliated the affections of his subjects, by dismissing the new parliaments and recalling the old ones. Though the prudence of Lewis had suggested these compliances, he was anxious to preserve the royal authority pure and entire: he avowed in one of his earliest speeches, in the great chamber of parliament, that the steps he had taken were designed to ensure the tranquillity and happiness of his subjects; and he hoped, from the zeal and attachment of the present assembly, for an example of submission to the rest of his subjects; he farther said, he was desirous of burying in oblivion all past grievances, and that he should ever behold with extreme disapprobation, whatever might tend to create divisions and disturb the general tranquillity. It was, however, the misfortune of this monarch, as it was that of Charles I., to come to the crown at a period when a great change in public opinion had long been preparing, and was now arrived at a point, which announced a speedy crisis in the political system. The despotism of the last two reigns had exasperated men's minds, and rendered them alive to the evils of arbitrary power, while the weakness and debauchery of Lewis XV. had accustomed the nation to regard the crown with contempt. "The profligacy of the nobles, the rapacity of the courtiers, the disputes and vices of the clergy, had sapped the foundations of social order; and, in the mean time, a set of able and eloquent writers had arisen, who, by the united powers of argument and ridicule, aggravated all the faults of ancient establishments, and endeavoured to subvert public opinion." The finances were in a state of derangement, and though the king himself was extremely moderate in his expences, his economical plans were thwarted by the queen and the princes of the blood.

The final conquest of the Corsicans, who, provoked by the oppressions of their governors, had, once more attempted to regain their former liberty, was the first event of importance which took place after the restoration of public tranquillity; but the kingdom was a prey to disorder from other causes. A scarcity of corn happening to take place just at the time that some new regulations had been made by M. Turgot the new financier, the populace rose in great bodies, and committed such enormous outrages, that a military force became absolutely necessary to quell them. The humanity of Lewis was shewn in an edict, which he caused to be registered in parliament, sentencing the deserters from the army, in future, to work as slaves on the public roads, instead of punishing them, as formerly, with death; and with equal attention to the general welfare of his subjects, he seized the moment of peace to fulfil those promises of economy, which on his accession he had given to the people. Particular attention was paid to the state of the marine; and the appointment of M. de Sartine, in 1776, to that department, did honour to the penetration of the sovereign. Shortly after this, notwithstanding the danger of the example, France took a decided part in the quarrel between England and her American colonies, permitting some of her subjects, men of high rank and station in the country, to cross the Atlantic, and serve in the republican armies. The consequence of these measures was a declaration of war on the part of England. After a variety of fortune, France and her allies succeeded in detaching America from the British crown; yet the expence of such widely extended operations left the French finances in a state of aggravated disorder, while the event could not fail to operate in behalf of antimonarchical principles. In the mean time successive ministries had adopted various and contradictory systems with regard to external and internal policy; and several projects of reform had been proposed and discussed, with no other advantage than that of accustoming the nation to debate with freedom all public topics, and open its eyes to existing abuses. Without pretending to enumerate the events of the present reign as they occurred, the record of which would fill a volume much larger than that of which we can only occupy a very few pages, in the description of an era more important to France and the world than can be found in history; we shall only refer to some of the more prominent events, which led to the fatal, unjust, and cruel termination of the reign and life of Lewis XVI.

Of the ministries employed by Lewis, several were distinguished for enlarged and philosophical views, though, as it afterwards proved, they were very little accommodated to circumstances and the ancient constitution of the country. Among the more remarkable occurrences of the period of which we are speaking, was the appointment of M. Neckar to the administration of the finances of the country. Hitherto France had carefully excluded aliens from the country and established faith from the controul of her revenue; nor was it less hostile to the feelings of the court, that a person without rank should be elevated to so high an office in the state: nevertheless M. Neckar was a Swiss by birth; a Protestant in religion; and a banker by profession. In the year 1780, the king fixed on the anniversary of his birth to render the day memorable in the annals of his country by a new instance of humanity, and abolished for ever the savage custom of "putting the question," as it was denominated, that is, of extorting confession from persons accused, by the instrumentality of the rack and other engines of torture;—a custom which had been so long established by the practice of ages, that it seemed to be an inseparable part of the constitution of the courts of justice in France. At  
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the same time, he rendered himself worthy of public esteem, by diminishing his own expenditure, and by sacrificing the magnificence of his court to the ease of his subjects. Unfortunately, however, the popular discontents were excited in the following year, by the dismissal of the then popular minister M. Neckar. He had conceived the arduous project of supporting the war by loans without taxes; and the rigid economy which he had introduced into all the departments of the household, and the various resources that presented themselves to his fertile genius, had supported him amidst the difficulties that attended his system. The austerity of his manners, increased probably by the difficulties with which he was surrounded and interrupted, rendered him exceedingly obnoxious to the queen and persons about the court, who took every opportunity of representing the reforms, which he had introduced, as inconsistent with the dignity of the crown: he was therefore dismissed from the high office, which he had held with great reputation. The effect of his dismissal was a vast abatement of public confidence in the permanency of the state; three different persons succeeded one another in rapid succession, as finance ministers; these, however, whatever might be their intentions, served only to increase the jealousy of the people, and the failure of the celebrated "Caisse d'Escompte" completed the universal consternation. The stoppage of this national bank was imputed to a scarcity of specie, but the real cause was probably owing to an immense loan advanced secretly to the government. Some successful expedients revived the credit of the bank, and its stock rose to above double the original subscription; by these means public credit was restored throughout the kingdom. In 1783 M. de Calonne, who had already successfully filled with acknowledged reputation the office of intendant of Metz, and afterwards of the provinces of Flanders and Artois, was nominated to the post of comptroller-general. This gentleman, whose name was accidentally omitted in the alphabetical arrangement of the Cyclopaedia, was born at Douay, in 1734, educated at Paris, and became an advocate of considerable reputation. After some attendance at the bar, he obtained, as we have seen, various important trusts, till he became prime minister. When he succeeded to this office, it was said, he did not find a single crown in the treasury. In this important office he continued about four years, and by some specious operations he restored an apparent prosperity to the affairs of the state, and maintained the public credit by a punctuality, till then almost unknown, in the payments from the royal treasury. He laboured with unwearied assiduity to restore the equipoise between the annual income and expenditure, and to provide a supply for the emergencies of the state, without vastly increasing the burdens of the people, which, even before his administration, they were scarcely able to sustain. For this purpose, he advised the king, to revive the ancient usage of convening national assemblies of the *Notables*, to whom he proposed the bold project of suppressing the pecuniary privileges and exemptions of the nobility, clergy, and magistracy. This measure was too daring even for him to carry; it excited indeed to much ill-will and determined hatred from these powerful bodies, that M. de Calonne found it necessary to retire to England, where he wrote two defences in justification of himself and his measures. At the end of the war he returned to Paris, where he died in 1802. He was author of several other works, on the situation of his country, and on the state of its finances.

The states-general of the kingdom, as a body formidable to monarchical authority, had never been convoked since the year 1614, and it was therefore determined first to have re-

course to an inferior kind of assembly, denominated the *Notables*, because these were to be selected by the king from the different orders of the state, and therefore it was expected they would the more readily submit to the guidance of the court. This assembly had been convened by Henry IV. and again by Lewis XIII. and was now to be summoned by the authority of Lewis XVI. The writs for calling them together were dated the 29th of December 1786; and they were addressed to seven princes of the blood, nine dukes and peers of France, eight field marshals, twenty-two nobles, eight counsellors of state, four masters of requests, eleven archbishops, thirty-seven persons high in the profession of the law, twelve deputies of the *pays d'états*, and twenty-five magistrates of the different towns in the kingdom. The first meeting of this assembly, in the month of February 1787, disclosed an enormous deficit which had hitherto been concealed. Great taxes were proposed to make good the deficiency, which the parliament of Paris refused to register, and thus refusing, that body was immediately banished the capital. The duke of Orleans, a man who disguised the worst principles, and the most criminal ambition under the mask of patriotism, and who probably, from this moment, was perpetually engaged in intrigues to ruin the king and subvert the constitution, having entered a protest in favour of the parliament, partook of its punishment. Various measures, some harsh, some conciliatory, succeeded, all displaying the embarrassment of the government, and the progress of the public discontents. M. de Calonne was now dismissed; Neckar was recalled; and at length, after a third convocation of the notables to no good effect, it was resolved to adopt the alarming expedient of calling together an assembly of the states-general, a circumstance that was looked on with anxious dread by the partisans of the court, and which was anticipated with pleasure and delight by those who were hoping for some radical change in the affairs of the state. On the dismissal of the notables, they were addressed in a moderate and very conciliatory speech from the throne. During the delay, the popular cause had still been gaining ground in the public mind, by meetings held in the capital and provinces, at which the utmost freedom, and no small portion of violence, in discussing political points, were indulged, and men of the inferior classes were habituated to act in concert, and become familiar with their own strength.

The time appointed for the convention of the states-general was now approaching, and the means of assembling them formed a matter of difficult deliberation in the cabinet. The last meeting, in 1614, had been convened by application to the bailiwicks. This mode was liable to strong objections; the bailiwicks had been increased in number and jurisdiction, several provinces having, since that period, been united to France; and the numbers and quality of the members were no less an object of serious attention: it was not, therefore, till the close of the year, that the proposal of M. Neckar was adopted, which fixed the number of deputies at 1000 and upwards, and decreed that the representatives of the third estate or commons should equal in number those of the nobility and clergy united. It remained now, as a matter of vast importance, for the popular party to carry the measure of the votes being taken, not by orders in three distinct houses, but by numbers in one house. As this would infallibly throw the whole power into the hands of the third estate, it was long and vigorously opposed by the royalist and aristocratical parties. At length the commons, thinking themselves sufficiently supported by the voice of the people, declared themselves "The National Assembly," and assumed the whole legislative authority. (For an account of the great operating and immediate

causes of the French revolution, we shall refer to the article *REVOLUTION*, and in the present article confine ourselves to those events which were closely connected with the conduct of the king.) During the violent and momentous contentions which were excited in every part of the kingdom, and particularly at Paris, the king, never steady to his purpose, fluctuated between opposite councils. His chief desire was, evidently, to preserve tranquillity, and prevent the effusion of blood, and he was prepared on his own part to submit to any sacrifices for this purpose that might be required of him. The states had been summoned to meet at Versailles on the 27th of April, and most of the deputies arrived at that time; but the elections for the city of Paris not being concluded, the king deferred the commencement of their sessions till the 4th of May. During this period, the members assembled, having little to do, spent their time in forming an intimacy with each other. Some of them united themselves into a club, into which none were admitted but those who were deemed zealous advocates for the popular cause. This society, originally formed at Versailles, was, hereafter, found sufficiently powerful to give laws to France, under the appellation of the Jacobin club, and to excite an almost universal terror and alarm through Europe. The states-general commenced their business by going in solemn procession, preceded by the clergy, and followed by the king himself, according to ancient custom, to church, to perform an act of devotion. The nobles and superior clergy were splendidly arrayed: the commons appeared in black. The assembly was now opened by a short speech from the throne, in which the king congratulated himself on thus meeting the people assembled; and having alluded to the difficult circumstances in which they were placed, he concluded with the following prayer, "May an happy union reign in this assembly, and may this epocha become ever memorable for the glory and prosperity of the country. It is the wish of my heart; it is the most earnest desire of my prayers; it is the price which I expect from the sincerity of my intentions and my love for my people." Several weeks were spent in discussing mere matters of form; in the mean time the people from without were vexed that no important step was taken to remedy the evils under which they laboured. They imputed this delay to the nobles and clergy, who became exceedingly unpopular. The leaders of the commons, called at that period the *tiers état*, took advantage of the change which was taking place in the minds of their countrymen, and formed the project of seizing the legislative authority of France: they almost instantly declared that the representatives of the nobles and clergy were only the deputies of particular incorporations, whom they would permit to sit and vote among themselves, but who had no title in a collective capacity to act as legislators of France. Some of the clergy had joined them; and they then proceeded to announce themselves, by a solemn decree, the sovereign legislators of their country, under the name of the "National Assembly." M. Bailly, the celebrated astronomer, was the first president: its earliest acts were decisively expressive of its own sovereignty. This was in the middle of June, and by the 19th a majority of the clergy voted for the verification of their powers in common with the national assembly, and they resolved to unite with them on the following day. At this important crisis the nobles perceived, that unless they could make a decisive stand all would be lost: they accordingly addressed the king, intreating him to dissolve the states-general; and on the next day, the 20th, when the president and members were about to enter as usual into their hall, they found it surrounded by a detachment of the guards, who refused them admission, while the heralds at the same time proclaimed "A royal

session." Alarmed and irritated by this unexpected event, they instantly retired to a neighbouring tennis-court, where, in the vehemence of enthusiasm, they took a solemn oath, "never to separate till the constitution of their country should be completed." The royal session was held in the most splendid form, but altogether in the style of the ancient despotism: the superior orders were seated while the commons were kept an hour in the open air, while it rained, before they were admitted. The king now assumed a high tone, delivered his speech, ordered the deputies to retire, and then left the assembly. He was followed by the nobles and part of the clergy, but the commons and those attached to them remained in gloomy silence, which being interrupted by an officer of the crown, who was left to see the intentions of his majesty carried into effect, the count de Mirabeau, starting from his seat, indignantly exclaimed, "The commons of France have determined to debate; you, sir, who have neither seat nor voice, nor a right to open your lips here, are not to remind us of the king's intentions. Go tell your master, that we are here by the power of the people, and that nothing shall expel us but the point of the bayonet." The king gave way, and at first, anxious to spare the blood of his people, recommended the higher orders to join the deputies of the commons; but, in a few days, he saw, or was persuaded by the queen and her party, that the obvious tendency of the popular measures was the entire subversion of all monarchical power; he therefore gave orders for the assembling of troops round the capital, and ventured upon the step of dismissing Neckar, and commanding him instantly to quit the kingdom. Paris burst into a flame upon this unexpected event; commotions took place; the soldiers were commanded to suppress the seditious assemblies; but they without hesitation grounded their arms instead of firing on the people; a vast body of national militia was organized, who supplied themselves with arms from the arsenal of the invalids, and on the memorable 14th of July, 1789, hostilities against the royal authority openly commenced by the storming of the Bastille. Resistance to the popular torrent was now in vain; the king recalled Neckar, who returned amidst the acclamations of the whole nation, and resumed the reins of government. Schemes for a new constitution and new measures of finance were discussed with calmness and composure, till a scarcity of provisions, joining with other causes of public agitation, inspired the populace with uncontrollable fury. In the beginning of October a dreadful insurrection took place, in which an immense armed mob marched to Versailles, broke into the palace, massacred some of the guards, and compelled the king, with the queen and his family, to accompany them to Paris. The triumph of the popular party was followed by the emigration of some of the most zealous friends to royalty, who carried into foreign countries a desire of exciting those hostile interferences on the part of the neighbouring powers in the affairs of France, which in the end proved destructive to the king and his family. On the 19th of October the national assembly, which had followed the king to Paris, opened its first session; and a constitution was speedily formed on the basis of a limited monarchy; a decree was passed, which put an end to all distinction of orders and immunities, so far as privileges were concerned, and the whole of the lands belonging to the church were confiscated for the purpose of supplying the exigencies of the state. This measure was proposed by M. Talleyrand, the bishop of Autun, who afterwards took a lead in the revolution. A provision was, at the same time, made for the national clergy, who were in future to be paid by the state. On the day following that, on which this important measure was adopted, a decree was passed, suspending the parliament of the kingdom.

dom from the exercise of their functions. During the winter the king had been strictly watched by numerous guards placed round his palace, so that he was regarded as in a state of captivity. To obliterate this impression, if possible, he appeared in the assembly, and in the presence of the deputies of the nation made a solemn declaration of his resolution to adhere to and defend the new constitution to the last moment of his life. On the 14th of July it was determined to commemorate the destruction of the Bastille, that fortress of despotism: never was a more splendid spectacle. The national assembly and the court joined in the procession that was made on the occasion, and when every thing was properly arranged to create effect, the king, after a serious invocation to God, approached the altar, and amidst the most solemn and awe-inspiring silence, took the following oath: "I the king of the French do swear to the nation, that I will employ the whole power delegated to me by the constitutional law of the state, to maintain the constitution, and enforce the execution of the law." The national assembly then took oaths of fidelity to the nation: as did La Fayette and others in the name of the national guards. After this a "Te Deum" was sung, the performance of which was sublime beyond the power of description. "Never," says the historian, "was there before such an orchestra, or such an audience; their numbers baffled the eye to reckon, and their shouts in full chorus rent the skies. It is impossible to enumerate all the means which were employed to add splendour to this day. It ended with a general illumination, and no accident occurred to disturb the public tranquillity."

Several new efforts were now making by the disaffected among the nobles and clergy to excite disturbances in various parts of the kingdom. Emigration became more frequent, and comprehended the king's aunts, and most of the princes of the blood, while troops were collected and openly formed into an army on the frontiers. The public suspicions were naturally kept awake by these circumstances, and popular ferments occasionally broke out in the capital and provinces. In April, 1791, the king and his family preparing to go to St. Cloud, to spend the Easter holidays, were forcibly stopped by the populace, who were suspicious that he meant to quit the capital. La Fayette drew out the national guard, but they, with one consent, refused to act against the citizens: "We know," say they, "that we are violating the laws, but the safety of our country is the first law." The king went to the assembly and complained of the insult: he was answered respectfully by the president, and continued his journey. He now endeavoured to convince foreign courts that he was no longer in a state of thralldom, declaring his cordial assent to the new order of things.

About this period, M. de Brouillé, to whom the protection of the frontiers was entrusted, was employing every means in his power to render the country defenceless. The garrisons were left unprovided; disunion was spread among the national troops, who were removed from the frontiers, and their place was occupied by foreigners, wherever it could be done. The emigrants abroad, and their friends at home, were lying in wait for an opportunity of revolt; when suddenly, on the 21st of June, it was announced from the Tuilleries, that the king, the queen, their children, together with the king's eldest brother and his wife, had quitted the palace and the capital. The national assembly took upon themselves the government, and decreed their sittings to be permanent: they sent at the same time messengers in all directions to attempt to lay hold of the fugitives. At Varennes they were stopped, arrested, and brought

back to Paris in triumph. The alleged reason for this departure was the danger and insult to which the king, and more especially the queen, were exposed, from the licentious violence of the Parisian mob; but there is no doubt that it was connected with the plans of the emperor Leopold and the emigrants, who were prepared, by force of arms, to make a grand effort in behalf of a counter-revolution. The king's brother, with his consort, who took a different road, made their escape. The national assembly proceeded with their labours, which they brought to a conclusion on the following September. The constitution, as fixed on at that time, was presented to the king, who solemnly accepted it, and swore to maintain it inviolate. On the 30th of September, the national assembly, which has been known since by the name of the "Constituent Assembly," dissolved itself, and gave place to the succeeding "Legislative National Assembly," which had been elected according to the rules prescribed by the new constitution. It was soon evident that France would have a foreign war to sustain with the powers coalesced for the restoration of the ancient monarchy, and for the further purpose of making conquests upon the French territories. In proportion to the national danger, the suspicions of the people increased, and their lost confidence in the king could never be recalled. New jealousies were excited by the interposition of the royal negative, allowed by the new constitution, against two decrees of the assembly, one levelled at the emigrants, the other at the non-juring priests. War was declared by the assembly against the emperor in April, and armies marched to the frontiers. A decree passed the assembly for forming a camp of 20,000 men near Paris, which Lewis, conceiving it a plan designed to overawe the more moderate party, and strengthen that of the Jacobins, refused to sanction, as he did likewise a severe decree against the refractory clergy. He also dismissed some of the popular ministers who had been forced upon him. The discontent which these measures excited burst out into a furious insurrection on the 20th of June, in which an armed mob made their way into the Tuilleries, and treated the royal family and their attendants with the grossest personal insults. The king displayed on this, as on all other occasions, great fortitude; and in reply to threats against his life, repeated in the lowest and coarsest language, he exclaimed, "Alas! would that my life could secure the happiness of the country, how readily would I offer it as a sacrifice." A calm now succeeded, in which the king and the national assembly appeared to unite in plans for the defence of the country: in the mean time dangers were accumulating, and the approach of the duke of Brunswick, with the Prussian army, preceded by a most menacing manifesto, in which the king's accession to the new constitution was represented as a mere involuntary compliance, stimulated the people almost to madness. The republican party determined to take advantage of this circumstance, with a view of deposing the king, and instituting a republic. At length, Petion, the mayor of Paris, appeared at the head of the sections, at the bar of the national assembly, to demand the deposition of the king. This was on the 9th of August; and at six on the following morning the king was seen reviewing his troops. He was received at first with shouts of *Vive le roi*, which were shortly overwhelmed with those of *Vive la nation*. The king returned to the palace, and the multitude continued to collect. The national guard seemed undetermined what to do as they assembled in divisions near the palace, and had a steady resistance been made from within, it has been thought they would have joined the royal party. The king was advised to seek protection in the hall of the national assembly: he was willing to comply; but

but the queen opposed, with vehemence, the humiliating proposal, till actual danger surrounded her person and children; she then consented, and the king, queen, the princes Elizabeth, the king's sister, with the dauphin and princefs royal, went on foot to the hall of the assembly. "I am come hither," said his majesty, as he entered the doors, "to prevent a great crime. Among you, gentlemen, I believe myself in safety." By an article of the constitution, the assembly could not deliberate in presence of the king. The royal family were, therefore, placed in a box separated from the hall, where they remained 14 hours, without refreshment, obliged to hear discussions in which the royal character and office were treated with every mark of insult. At length the fatal decree was passed that the royal authority should be suspended, and the nation was invited to elect a Convention, to determine on the nature of its future government. On that fatal day a numerous body of insurgents attacked the palace of the Thuilleries, which was defended by Swiss guards: a bloody engagement ensued, which terminated in the massacre of the greatest part of the Swiss, and several other regiments. As soon as the royal authority was suspended, the king and his family were sent to the Temple as a state prison. Massacre succeeded now upon massacre, till at length, on the second and third days of September, the most cruel and savage scenes were exhibited that were ever witnessed in a civilized country. More than a thousand state-prisoners were basely and infamously murdered by the ruffians of the capital, among whom was the beautiful princefs of Lamballe, whose bleeding head was carried on a pike through the streets of the city, and under the windows of the room in which the queen was confined, whose intimate favourite she had been. These acts, to which the royal family could not be strangers, they might well regard but as preludes to their own death: there was no party left in the country to espouse their cause; and no individual durst lift up his voice in their defence. The new convention was assembled on the 20th, and their first decree was the eternal abolition of royalty, which was carried by acclamation: this object being attained the house adjourned, and copies of the decree was sent into every village and commune of France. The most violent measures were adopted; nor could the moderate party in the convention restrain the madness of the Jacobins, who were bent on levelling all distinctions; to bring into contempt every thing in letters and in science that was in the least raised above the comprehension of the lowest of the people. The intention was soon avowed of bringing the king to trial. It was in vain that those, who were anxious to save his life, appealed to the inviolability of his person, declared by the constitution he had accepted: principles, however sacred, were made to yield, and a committee was appointed to give in a report upon his conduct. The result of this was, that various accusations were brought against him, and the convention resolved to take upon themselves the part of accusers and judges. On the 11th of December, the fallen monarch was brought to the bar to answer to the heads of accusation drawn up against him for the crime of tyranny and treason towards the nation. He defended himself with judgment and presence of mind, and received the advice and assistance of three eminent advocates, who generously and nobly undertook his cause, though with great hazard to themselves. The proceedings were carried on till the 26th of December, when M. Defeze, one of his advocates, read a defence of his client, which being finished, the king rose, and holding a paper in his hand, pronounced, in a calm and dignified manner, and with an impressive tone of voice, "Citizens, you have heard my defence; I now speak to you, perhaps

for the last time, and solemnly declare that my counsel have asserted nothing to you but the truth; my conscience reproaches me with nothing." The discussion was finally closed on the 16th of January; and after a sitting of 34 hours, the punishment of death was awarded by a very small majority of the convention. M. Defeze then invoked the assembly, in the name of his colleagues, to consider by what a trifling majority the punishment was pronounced against the dethroned monarch; "Do not afflict France," said he, "by a judgment that will appear terrible to her, when five voices only were presumed sufficient to carry it." He appealed to the eternal justice and sacred humanity, to induce the convention to refer their sentence to the tribunal of the people. "You have either forgotten or destroyed," said M. Tronchet, another of the king's advocates, "the lenity which the law allows to criminals, of requiring at least two-thirds of the voices to constitute a definite judgment." The sentence was ordered to be carried into execution without delay. The king and his family had been kept separate from each other; but he was now permitted to see them. The short interval allowed him he employed in the preparations for death enjoined by his religion, to which he was sincerely attached. The final meeting and separation of the king from his family was affecting in the extreme. On the morning of the 21st of January, at eight in the morning, he was summoned to his fate. He ascended the scaffold with a firm and dignified step; and his behaviour there partook of the calm fortitude which had distinguished him through all his scenes of suffering. Raising his voice, he exclaimed, "Frenchmen, I die innocent; I forgive my enemies." He would have proceeded, but was prevented by the beating of the drums, placed on the spot purposely to drown his voice. The executioners came forward to perform the bloody deed, which being perpetrated, the bleeding head was held up to the view of the surrounding crowd, of whom some few exclaimed "Vive la Republique;" but the great mass of spectators was too deeply absorbed in thought to join in the shout which the leaders attempted to excite. The body of the deceased victim was thrown into a pit filled with quicklime, and a guard placed around it till it should be consumed. The unhappy monarch was in the thirty-ninth year of his age, and the nineteenth of his reign. He left two children, a son and a daughter, of whom the son died very miserably in 1795, and his sister in the following year. The queen was brought to the scaffold in 1793, and his sister in 1794. Such were the misfortunes to which this royal house was subject. Lewis XVI. possessed from nature a good understanding, which, however, was blunted by the early indulgences of a court. He had a strong sense of justice, and his humanity was much superior to what could have been expected from a person in his high station in life. By posterity he will be regarded as one of the best and most virtuous of the French kings. He had acquired a large portion of general knowledge, and on some literary subjects he entered rather deeply. He wrote well, and excelled in clearness of expression and methodical arrangement. In vigour of mind he was unquestionably deficient; but in reviewing the history of the period, we cannot conceive how he could have acted so as to have successfully opposed the voice of the people. It was his misfortune to have fallen on difficult times; he could not stem the torrent of public opinion; and it is probable that few princes, if any, would have been capable of extricating themselves from such difficulties as surrounded Lewis XVI. during a great part of his calamitous reign. For farther particulars relating to Lewis's of France, the reader is referred to the Modern Universal History; to the History of France, London, 1790; and

and to the History of the French Revolution, by Rabaut St. Etienne.

LEWIS, JOHN, a learned English divine, was born at Britton in 1675. He was educated in grammar learning at the free-school of Winbourn, in Dorsetshire, and received his academical education at Exeter college, Oxford, where he took his degrees. Having been ordained, he officiated some time as curate of St. John's, Wapping. In 1699 he obtained the rectory of Acris, in Kent, which he resigned in 1706, when he was presented by archbishop Tension with the rectory of Saltwood in Kent, with the chapelry of Hythe annexed. He was afterwards collated to the vicarage of Minter, in the isle of Thanet, and in 1719 archbishop Wake constituted him master of Eastbridge hospital, in the city of Canterbury. He died at Margate in 1746. He was author of a great number of publications, which reflected credit on his industry and learning; among these were "The Life of Wickliffe;" "Wickliffe's Translation of the New Testament;" "The History and Antiquities of the Isle of Thanet;" "The History of the Abbey and Church of Faversham;" "The Life of William Caxton;" "The History of the Translations of the Holy Bible and New Testament into English."

LEWIS, in *Geography*, is the most northern, and the largest of the Hebrides, or Western Islands, of Scotland. It is connected with the island of Harris by a narrow isthmus, which at low water is left entirely dry, and even at high water is not completely covered; whence the whole may be considered as one island. (See HARRIS.) The isle of Lewis is of very irregular form and boundary; and extends about 50 miles in length from north to south, by about twenty, on an average, in a transverse direction. Towards the centre the land is mountainous and boggy; but near the shore it is rather flat, and is intersected by numerous inlets or bays of the sea. The island is almost destitute of wood; a few birches, hazles, and a little heath, being the only species of shrubs seen here: but it is said that Lewis was formerly covered with plantations; the decay and destruction of which contributed to form the peat-earth, with which the island abounds. Springs, lakes, and rivulets, scattered through the island, furnish in all parts abundance of fresh water. With respect to the climate, the spring is uncommonly cold and backward, the summer warm, the autumn accompanied by profuse rains, the winter without long or severe frosts, or very weighty falls of snow, but with constant winds, and these stormy and sharply cold. Among the wild animals, the isle still produces deer or rocs. Great numbers of wild fowls of many different species frequent the shores, the lakes, and the cliffs of the mountains; among others, is the eider goose, the down of which is held in high estimation. Immense shoals of fish, of an innumerable diversity of kinds, haunt the coasts.

The island is intersected by arms of the sea, called lochs, which run to a considerable distance inland, both from the eastern and western sides. One of the chief is loch-Roag, on the west, which is two leagues in breadth at the entry, and runs up, in a south-eastern direction, about twelve miles into the island. This loch contains several islands, some of which are inhabited; one, called Large Bernera, is eight miles in length. The whole of this curious loch abounds with safe places of anchorage, sufficient to hold the whole British navy, or even that of all Europe. About 140 tons of kelp, of a superior quality, are annually made from loch Roag. On the eastern coast, loch Seaforth runs into the country to a great distance; loch Keose and loch Leurbust advance also far inland from the east; but loch Stornaway is most important, on account of the town which

stands near it, and which is the capital of the island. On the coast, in this parish, is a large cave, into which the sea enters at high tide; this cavern is only accessible from the sea. When it was first noticed, a great number of seals were killed annually in it; and the practice is still continued. The entrance of the cave is very deep and narrow, and does not admit more than the breadth of a six-oared boat. The interior is divided by a large pillar into two arches. Its whole length is about an English furlong.

The island of Lewis is divided into four parishes; named Barvas, Lochs, Stornaway, and Uig. It has various small islets attached to it. In the parish of Barvas is the island of Rona, which is a mile in length, and half a mile in breadth; it is situated in the Northern ocean, and is supposed to be the farthest to the north-west of any land in Europe. The parish of Lochs derives its name from the great number of lakes which are interperfed over its surface. It is about nineteen miles in length and nine in breadth; along the coast it has a bold and rocky appearance; in the interior it is barren and inhospitable. About 50 tons of kelp are manufactured here annually; and the greater number of the inhabitants are employed in the fisheries on the coast. The parish of Stornaway is of very great extent; but the inhabited part is of a triangular form, of which two of the sides are about ten miles, the other seven. The town of Stornaway, from a very small origin, has of late, by the exertions of lord Seaforth, arrived at a considerable extent. The harbour is excellent, and well frequented; the principal source of employment is the prosecution of the white and herring-fisheries in the bays, in which about 35 or 40 small vessels are annually fitted out. It is a port of the custom house, and has a post-office, and a regular weekly packet. The houses of the town are, in general, well built: here are a convenient custom-house, a town-house, a commodious church, an assembly-room, and two school-houses. On an elevated situation, near the town, stands Seaforth lodge, the seat of lord Seaforth, who is the proprietor of the island. The parish of Uig is fifteen miles in length, and thirteen in breadth: the interior is hilly, covered with heath, and interperfed with small lakes; the coasts are mostly level and cultivated. The fisheries and the manufacture of kelp are here also the chief sources of subsistence to the inhabitants. Near the hamlet of Calarnish, at a short distance from loch Roag, is a Druidical temple, formed by a circle of twelve stones or obelisks, each about seven feet high, and six feet distant from each other: in the centre is one of a larger size, thirteen feet from the ground: directly south from the circle are three obelisks, standing in a line; another such to the west, and one to the east; each stone being nearly equal in size, and arranged at equal distances. Towards the north are two straight ranges of obelisks, forming an avenue to an opening between two of the stones which form the circle. Each of these ranges consists of six stones, regularly placed, one opposite to another. All the stones are in a rough natural state, as taken from the shore. At Melita are the remains of a nunnery, still called in the Gaelic *Teagh nan caith-chan dhu*, "the house of the old black women." At Caillaway is a Danish fort, quite circular, with a double wall of stone, thirty feet in height. This is broad at the base, and narrower at the top, like the frustum of a cone. In the year 1794, there was living in this parish a *lusu nature*, of which Mr. Monro, the minister, gives the following account in his statistical report to sir John Sinclair.—"Very near the manse there lives a woman, who has four distinct breasts or *mammae*. She has had several stout, healthy children, and suckled them, and likewise one of the minister's children. She has nipples and milk in each of the four breasts; the

two upper are situated under the arm-pits, and by being diffended with milk, are very troublesome to her for the first two or three months after delivery."

The population of Lewis, in the year 1796, was 8311; which was an increase of 1925 from an enumeration which was made in the year 1755. The inhabitants of the whole island are scattered, for the most part, in single families, or clusters of two or three families, around the coast, or through the interior parts. Some large tracts are without inhabitants; while upon others the population is more closely assembled. There is scarcely any regular road: the moor, which reaches across the island from Stornaway to Uig, is so extensive and soft, that it would require the labour of many ages to form a regular road through it. Martin's Description of the Western Islands of Scotland, 8vo. 1716. Buchanan's Travels in the Western Hebrides, from 1782 to 1790," 8vo. 1793.

LEWIS, a town of America, in Essex county, S.W. of Lemington adjoining, in Vermont; about 8 miles S. of the Canada line.

LEWIS CREEK, a small stream in Vermont, which falls into lake Champlain at Ferrisberg, a little N. of Little Otter creek.

LEWIS and Rehoboth, a town in Suffex county, Delaware, containing 1514 inhabitants.

LEWISBURG. See LOUISBOURG.

LEWISBURG, a county in Orangeburgh district, South Carolina.—Also, a post-town of North Carolina, and capital of Franklin county, which lies on Tar river, and contains between twenty and thirty houses, a court-house, and gaol; 30 miles N. of Raleigh.—Also, a post-town and chief town of Greenbrier county, Virginia, on the north side of Greenbrier river, containing about sixty houses, a court-house, and gaol; 250 miles W. by N. of Richmond. N. lat. 38° 8'.—Also, a post-town of Northumberland county, Pennsylvania, called also "Taritown," on the W. side of the Susquehanna, 7 miles above Northumberland; containing about 60 houses, and well situated for a good trade with the N.W. part of the state; 30 miles E. by N. from Aaronsburg.

LEWISHAM, a populous village, in the upper half-hundred of Blackheath, parish of Sutton at Hone, and county of Kent, England, is situated 5½ miles from London, and extends nearly a mile in length on the road to Bromley. Here was anciently a Benedictine priory, subordinate to the abbey of St. Peter in Ghent, and most probably founded in the Saxon times; this manor having been given to that abbey by Elthruða, niece to king Alred. After the suppression of the alien priories, Henry V. made this a part of the endowment of his newly erected Carthusian priory at Shene. Lewisham is now the property of the earl of Dartmouth, whose seat on Blackheath is within the bounds of this parish. The present church was erected in the year 1774: its form is that of an oblong square, with a semi-circular recess at the east end for the altar. It contains two handsome monuments: one to the memory of Anne, wife of John Petrie, esq., was executed in Italy; it includes a fine bas-relief in marble, representing the deceased on her death-bed, with her husband and children lamenting round her. The other commemorates Margaret, relict of the Rev. Robert Petrie, and was sculptured by Banks; it represents Mrs. Petrie dying in the arms of Religion, supported by Faith and Hope. Many old monuments were thrown carelessly into the vault, when the church was rebuilt. An excellent free grammar school was founded by the Rev. Abraham Colfe, who was rector of this parish from the year 1610 to 1657. His will contains the regulations

of the school, and directs that it shall be for the education of thirty-one boys of the several parishes therein named; one scholar yearly to be sent to either of the universities. He also founded an English school here for thirty-one boys, and an alms-house for five "poor godly householders." The population of Lewisham, as returned under the act of 1800, amounted to 4007; the number of houses to 722. In this enumeration was included the chapelry of Sydenham, noted for its medicinal springs. Brayley's Beauties of England, vol. vii.

LEWISTOWN, a post-town in Lincoln county, Maine, on the east side of Androscoggin river, and bounded south-west by Bowdoin; containing 948 inhabitants; 36 miles N.E. of Portland.—Also, a post-town, called "Lewes," in Suffex county, Delaware, pleasantly situated on Lewes creek, three miles above its mouth in Delaware bay; containing a Presbyterian and Methodist church, and about 80 houses, in a street more than three miles in length, extending along a creek which separates the town from the pitch of the cape. Its situation is high. The court-house and gaol are commodious buildings; the entrance of the bay is crowded with vessels from all parts of the world, but during part of the winter is closed with ice. The circumjacent country is beautifully diversified with hills, woods, streams, and lakes, but much infested with mosquitoes and sand-flies. This town carries on a small trade with Philadelphia in the productions of the country. A manufacture of marine and Glauber salts, and magnesia, has been established here; 113 miles S. of Philadelphia. N. lat. 38° 6'. W. long. 75° 18'.—Also, the chief and post-town of Mifflin county, Pennsylvania, situated on the north side of Juniatta river, on the west side of, and at the mouth of, Cihicoquillis creek; about 23 miles N.E. of Huntingdon; regularly laid out, incorporated in 1795, and containing about 120 dwelling-houses, 523 inhabitants, a court-house, and gaol; 150 miles W.N.W. of Philadelphia. N. lat. 40° 33'. W. long. 77° 23'.

LEWUNAKBANNEK, a town on the Ohio, in which is a settlement of Christian Indians, formed by Moravian missionaries.

LEX, LAW. See LAW.

LEX *Amissa*, or *legem amittere*, in Law, is understood of an infamous, perjured person, who is said to *lose his law*; or, as Bracton has it, *non est ulterius dignus lege*. See INFAMOUS.

LEX *Judicialis*, is properly *purgatio, per judicium ferri*; sometimes called simply *judicium*.

LEX *Sacramentalis*, *purgatio per sacramentum*. See OATH and PURGATION.

LEX *Taliois*. See TALIO.

LEX *Terre*, the law and custom of the land; by which name it is distinguished from the *civil law*. See COMMON LAW.

LEX, *Legem terra amittere*. See AMITTERE.

LEXAWASCEIN, in Geography, a small river of Pennsylvania, which rises by several branches in Northampton county, Pennsylvania, on the east side of mount Ararat, which unite about 10 miles from its mouth in Delaware river. It joins the Delaware, after a south-east and east course, about 174 miles above Philadelphia.

LEXEN, a town of Moravia, in the circle of Olmutz; 18 miles N.W. of Olmutz.

LEXIARCHI, Δεξιαρχου, at Athens, six officers, assisted by thirty inferior ones, whose business it was to lay fines upon such as came not to the public assemblies, and also to make scrutiny among such as were present.

The lexiarchi kept a register of the age, manners, and abilities

abilities of all the citizens, who were always enrolled at the age of twenty.

**LEXICON**, Λεξικόν, the same with dictionary.

The word is chiefly used in speaking of Greek dictionaries: it is derived from the Greek λέξις, *word, diction*; of λέω, *I speak*.

**LEXINGTON**, in *Geography*, a county of America, in Orangeburg district, South Carolina.—Also, a post-town of Virginia, and capital of Rockbridge county; situated on the post-road from Philadelphia to Kentucky, by way of the Wilderess, and about a mile south of the north branch of James's river; containing a court-house, gaol, and about 100 houses. Its situation is agreeable and healthy, and the adjacent country highly cultivated. Near it is "Liberty-hall Academy," now "Washington College," built of stone, and capable of containing forty or fifty students, and has its name endowed by the distinguished personage whose name it bears. The town is 159 miles W. by N. of Richmond.—Also, a post-town of Kentucky, formerly the metropolis of that state; situated on a rich extensive plain, in Fayette county, on the north side of Town fork, a small stream, that falls into the fourth branch of Elkhorn river. The town is built on a regular plan, and contains about 350 houses, five places of public worship, a court-house, and gaol, and also an university, with several manufactories and storehouses. It is an agreeable flourishing town, on the head waters of Elkhorn river; 24 miles E. of Frankfort. The number of inhabitants is 1795. Near the town was found, upon digging five or six feet deep, a large flat stone, covering a well, artificially stoned; and in its vicinity are also the remains of two ancient fortifications, furnished with ditches and bastions, overgrown with large trees.—Also, a post-town in Rowan county, North Carolina, 309 miles from Washington.—Also, a small post-town of Georgia, formerly called the "Great Falls," situated on the south side of Ogeechee river, on a beautiful eminence which overlooks the falls of the river; 2 miles from George town.—Also, a town in Middlesex county, Massachusetts, 11 miles N.W. of Boston, having a neat congregational church, and a number of compact houses. This town has been rendered famous by being the scene of a battle, fought April 19, 1775, which may be considered as the commencement of the American revolution. On the ground where this battle was fought is a stone monument, 10 feet high, with the following inscription: "Sacred to Liberty, and the Rights of Mankind!! The freedom and independence of America sealed and defended with the blood of her sons, &c. &c." Concluding, "The die was cast!!! The blood of these martyrs, in the cause of God and their country, was the cement of the union of these states, then colonies, and gave the spring to the spirits, firmness, and resolution of their fellow-citizens!" Morse.

**LEY**, in *Agriculture*, a term used to signify land in the state of sward or grass.

**LEY**, Sir JAMES, in *Biography*, a learned English judge, who flourished in the seventeenth century, the son of Henry Ley, esq. of Jessont, in Wiltshire, was, on account of his great merit, made lord chief justice, first in Ireland, and afterwards in England. He was likewise created baron Ley, lord high treasurer, and earl of Marlborough. His reports were printed in the year 1659.

**LEY**. See LEXIVIUM.

**LEYBA**, in *Geography*, a town of South America, in New Granada; 50 miles N.N.E. of Santa Fé de Bogota.

**LEYBOURNE**, WILLIAM, in *Biography*, a mathematician, was originally a printer in London. He published a course of mathematics, which was held in considerable esti-

mation. He was author of a treatise on Surveying, a work on Dialling, and another work, entitled "The Trader's Guide." He died about the year 1600.

**LEYDECKER**, MELCHIOR, a Dutch divine, was born at Middleburg in 1652. Having received a good education, he officiated as pastor of a church in his native place; and in 1678 was appointed professor of divinity at Utrecht, and soon after took his degree of doctor in divinity. He died in 1721. He was deeply read in theology, ecclesiastical history, and rabbinical learning; but he had no taste for polite literature, and was exceedingly bigotted to his own notions. Still he was desirous of uniting the Lutherans and Calvinists, and made some ineffectual efforts for the purpose. He was a voluminous writer, and his works are all written in Latin: of these the chief are, "A Treatise on the Republic of the Hebrews," in 2 vols.; "An Analysis of Scripture, with Rules for Preaching;" "A History of Janfenism;" "A Continuation of the Ecclesiastical History of Hornius, with Notes;" and "A History of the Church of Africa."

**LEYDEN**, LUCAS VAN. See JACOBS, LUCAS.

**LEYDEN**, in *Geography*, a city of Holland, the "Lugdunum Batavorum" of Ptolemy, and the "Caput Germanorum" of Antonine's Itinerary, is the capital of a small district, called "Rhyndal," comprehending 49 towns or villages, and, next to Amsterdam, the largest and most populous city of Holland; the number of inhabitants being estimated at about 50,000. It is situated on the ancient bed of the Rhine, which, by means of various streams, divides it into a number of islands, that communicate with one another by bridges, which are reckoned to be not fewer than 100. This city likewise carries on a daily intercourse by boats with Amsterdam, Haerlem, Utrecht, Delft, the Hague, &c. It has eight gates; and its ramparts are formed of earth, partly covered with turf, and partly faced with brick, and consisting of several bastions. The cloth manufactured at Leyden has been much celebrated, and it contains a staple-hall erected for the use of the manufacturers and merchants. The chief street of the town is constructed in the form of a crescent; and the principal public building is the town-house, which has many spires, and is a handsome structure, with a stone front. In the burgomaster's chamber is a very capital painting of the Last Judgment by Lucas of Leyden, for which the emperor Rodolphus is said to have offered as many gold ducats as would cover it; together with several other capital paintings, and a representation of the famous siege of 1574, wrought in tapestry. The great church is one of the handsomest in Holland. The common council of the city, called "Vroedschap," is composed of 40 persons, who are required to be natives of Holland, 28 years of age, and Protestants. Here are likewise four burgomasters, and eight echevins, and a grand bailiff, who administers justice in civil and criminal cases, jointly with the echevins. The fair of Leyden is an ancient establishment, and still much frequented: it occupies by its booths, arranged under trees, and along the borders of canals, about a fourth part of the town. In proof of the antiquity of this city, some allege an ancient round tower, called the "Burcht," about 600 feet in circumference, said to have been erected either by the Romans or Saxons; but Joseph Scaliger contends that it was built five or six centuries ago by the comtes of Holland. This city was considerably enlarged towards the south in the year 1389; but it has suffered much from sieges and the plague. In the year 1574, the Spaniards laid siege to it; but it was obstinately defended by the inhabitants, and even by the women, who lined the ramparts, and performed the duties of soldiers.

During

During this resistance, the misery of the inhabitants was extreme: 6000 persons died of famine, and the distress attending it; so that for 14,000 who survived, there remained no more than 107 muids of wheat. The general of the Spaniards, apprized of their situation, summoned them to surrender; but they replied, that they could not want subsistence, as long as their left arms remained, on which they were determined to feed, whilst with the right they defended the city. The constancy and courage of Adrian de Wers, burgomaster of the city, deserve to be recorded; when he was solicited by some of the inhabitants to surrender, he told them, "My friends, since I must die, it is of little importance whether I fall by you or by the enemy; cut me to pieces, and divide them amongst you; I shall die satisfied, if by my death I can be the least useful." Just as they were preparing to surrender, they received notice by some pigeons, that relief was at hand; and the dykes of the Meuse and the Issel having been opened, Louis Boissot, admiral of Zealand, advanced with a number of troops in flat-bottomed boats to their succour. The Spaniards, terrified by the inundation, abandoned the siege. In memory of this event the inhabitants have been accustomed every seven years to exhibit a spectacle of the siege. William Prince of Orange, just recovering from a dangerous illness, was carried to Leyden, that he might in person thank the citizens for their brave defence; he also liberally rewarded Boissot and Janus Douza, lord of Noortwyck, who commanded in the city, not forgetting the officers and soldiers; and besides granting several privileges to the city, he founded an university, and appointed Janus Douza the first curator. This university, says Mrs. Radcliffe, in her "Journey through Holland, &c." would scarcely be known to exist, if it had no more conspicuous objects than its buildings. The Dutch universities have no endowed foundations; so that the professors, who have their salaries from the states, live in private houses, and the students in lodgings. The library, to which Joseph Scaliger was a benefactor, is open only once in a week, and then for no more than two hours. To this, and other measures of Dutch policy, it is owing that the university has been of late years declining. There are students, however, of many nations and different religious profession, no oaths being imposed, except upon the professors. Physic and botany are cultivated with much success; and there is a garden to which not only individuals, but the East India company, contribute foreign plants. The salaries of the professors, exclusively of fees from the students, are nearly 200*l.* a-year. The government of the university is in the rector, who is chosen out of three persons, returned by the senate to the states; the senate consists of the professors; and, on extraordinary occasions, the senate and rector are directed by curators, who are agents for the states. The land adjoining to Leyden is very fertile and productive, and is much cultivated by gardeners, who supply Amsterdam with vegetables; and the rich meadows and pastures in the environs furnish excellent butter and cheese. Leyden is distant 14 miles N. of Rotterdam, and 19 S.W. of Amsterdam. N. lat. 52° 9'. E. long. 4° 20'.

The plays and players of the theatre of Leyden are not of the most refined sort; farce has not yet quitted tragedy, nor has Punch gained force; however, these exhibitions amuse persons, whose taste has not been formed upon refined models, and perhaps come more home to their business and bosoms, than the tragedies of Sophocles, or comedies of Menander, would do, if they were now to be represented in the original Athenian manner.

As to music, mechanical chimes, every quarter of an hour; *carillons* at noon, two or three times a week; and

huge organs, coarsely played, to more coarse plasmody, constitute all that Apollo and the Nine Muses have given to this place, in the way of harmony and melody, as far as we could discover. Burney.

LEYDEN, a small island in the East Indian ocean, near the coast of Java, within view from Batavia.—Also, a small island in the gulf of Manar, near the W. coast of Ceylon; 12 miles W. of Jaffnapatam.—Also, a small island in a bay of the Pacific ocean, on the N. coast of New Guinea. S. lat. 3° 58'. E. long. 135° 39'.—Also, a town of Prussia, 27 miles S.S.E. of Konigsberg.—Also, a post-town of America, in Oneida county, New York; 330 miles N.E. from Washington.—Also, a township in Hampshire county, Massachusetts, between Colerain and Bernardston; 29 miles from Northampton, incorporated in 1784, and containing 1095 inhabitants.

LEYDEN *Phial*, in *Electricity*, is a glass phial or jar, coated both on the inside and outside with some conducting substance, for the purpose of being charged, and employed in a variety of entertaining and useful experiments. See COATING and CHARGE.

It was thus called because Mr. Cunæus, a native of Leyden, was supposed to have first contrived, about the close of the year 1745, to accumulate the electrical power in glass by this method; and hence the operation of charging and discharging coated glass, in general, has been denominated the *Leyden experiment*; and a vacuum produced in a jar of this kind has been called the *Leyden vacuum*. But Dr. Priestley, the historian of electricity, informs us, that the person who first made this great discovery was Mr. Von Kleift, dean of the cathedral in Camin; who, on the 4th of November, 1745, sent an account of it to Dr. Leiberkuhn at Berlin: however, those, to whom Mr. Kleift's account was communicated, could not succeed in performing his experiments. The views which led to this discovery in Holland are stated by Dr. Priestley in the following manner: professor Muschenbroeck and his friends, observing, that electrified bodies, exposed to the common atmosphere, which is always replete with conducting particles of various kinds, soon lost their electricity, and were capable of retaining but a small quantity of it, imagined, that if the electrified bodies were terminated on all sides by original electrics, they might be capable of receiving a stronger power, and retaining it a longer time. Glass being the most convenient electric for this purpose, and water the most convenient non-electric, they first made these experiments with water in glass bottles; but no considerable discovery was made, till Mr. Cunæus, happening to hold his glass vessel in one hand, containing water, which had a communication with the prime conductor by means of a wire; and with the other hand disengaging it from the conductor, when he imagined the water had received as much electricity as the machine could give it, was surprized by a sudden shock in his arms and breast, which he had not in the least expected from the experiment. This experiment was repeated, and the first account of it published in Holland by Mr. Allamand and Mr. Muschenbroeck; by the able Nollet, and M. Monnier, in France; and by Messrs. Gralath and Rugger, in Germany. Mr. Gralath contrived to increase the strength of the shock, by altering the shape and size of the phial, and also by charging several phials at the same time, so as to form what is now called the *electrical battery*. He likewise made the shock to pass through a number of persons connected in a circuit from the outside to the inside of the phial. He observed that a cracked phial would not admit of being charged; and he discovered what is now called the *residium of a charge*. Dr. Watson, about

## LEYDEN PHIAL.

about this time, observed a circumstance attending the operation of charging the phial, which, pursued, would have led him to the discovery which was afterwards made by Dr. Franklin. He says, that when the phial is well electrified, and you apply your hand to it, you see the fire flash from the outside of the glass, wherever you touch it, and it crackles in your hand. He also observed, that when a single wire only was fastened round a phial, properly filled with warm water, and charged; upon the instant of its explosion, the electrical corrutations were seen to dart from the wire, and to illuminate the water contained in the phial. He likewise found, that the stroke, in the discharge of the phial, was, *ceteris paribus*, as the points of contact of the non-electrics of the outside of the glass, which led to the method of coating glass: in consequence of which he made experiments, that led him to conclude, that the effect of the Leyden bottle was greatly increased, if it was not principally owing to, not so much the quantity of non-electric matter contained in the glass, as the number of points of non-electric contact within the glass, and the density of the matter of which these points consisted; provided the matter was, in its own nature, a ready conductor of electricity. He farther observed, that the explosion was greater from hot water inclosed in glasses, than from cold, and from his coated jars, warmed, than cold. For his manner of explaining the shock of the Leyden phial, see AFFLUX.

Mr. Wilson, in 1746, discovered a method of giving the shock to any particular part of the body, without affecting the rest: he also increased the strength of the shock by plunging the phial in water, thereby giving it a coating of water on the outside as high as it was filled on the inside; he likewise found, that the law of accumulation of the electric matter in the Leyden bottle was always in proportion to the thinness of the glass, the surface of the glass, and that of the non-electrics in contact with the inside and outside thereof. Mr. Wilson made a variety of other experiments with the Leyden phial, which our limits will not allow us to recite.

Mr. Canton found, that if a charged phial was placed upon electrics, the wire and the coating would give a spark or two alternately; and that, by continuing this operation, the phial would be discharged; though he did not observe that these alternate sparks proceeded from the two contrary electricities discovered by Dr. Franklin.

The abbé Nollet made several experiments with this phial. He received a shock from a bottle, out of which the air had been exhausted, and into which the end of his conductor had been inserted. He ascribed the force of the glass in giving a shock, to that property of it, whereby it retained it more strongly than conductors do, and was not so easily divested of it as they are. He also first tried the effect of the electric shock on brute animals, and enlarged the circuit of its conveyance. See CURETIV.

M. Monnier is said to have been the first who discovered that the Leyden phial would retain its electricity for a considerable time after it was charged, and to have found it to do so for thirty-six hours, in time of frost; and it is remarkable that the French as well as the English philosophers made several experiments, which, with a little greater degree of attention, would have led them to the discovery of the different quality of electricity on different sides of the glass. But this was reserved for the ingenious doctor Franklin, who, in explaining the method of charging the Leyden phial, observes, that when one side of the glass is electrified positively, or *plus*, the other side is electrified negatively, or *minus*; so that whatever quantity of fire is thrown upon one side of the glass, the same is thrown out

of the other; and in a phial not charged, none can be thrown into the inside, when none can be got out from the outside; and there is really no more electric fire in the phial after it is charged than before; all that can be done by charging being to take from one side and convey to the other. Dr. Franklin also observed, that glass was imperious to electricity, and that therefore, since the equilibrium could not be restored to the charged phial by an internal communication, it must be done by conductors externally joining the inside and the outside. These capital discoveries he made by observing that, when a phial was charged, a cork-ball, suspended on silk, would be attracted by the outside coating, when it was repelled by a wire communicating with the inside, and *vice versa*. But the truth of this maxim appeared more evident, when he brought the knob of the wire communicating with the outside coating within a few inches of the wire communicating with the inside coating, and suspended a cork-ball between them; for, in that case, the ball was attracted by them alternately, till the phial was discharged.

Dr. Franklin also shewed, that when the phial was charged, one side lost exactly as much as the other gained, in restoring the equilibrium. Hanging a small linen thread near the coating of an electrical phial, he observed that whenever he brought his finger near the wire, the thread was attracted by the coating: for as the fire was taken from the inside, by touching the wire, the outside drew in an equal quantity by the thread. He likewise proved, that the coating on one side of a phial received just as much electricity as was emitted from the discharge of the other, in the following manner: he insulated his rubber, and then, hanging a phial to the conductor, he found it could not be charged, even though his hand was held constantly to it; because, though the electric fire might leave the outside of the phial, there was none collected by the rubber to be conveyed to the inside. He then took away his hand from the phial, and forming a communication by a wire from the outside coating to the insulated rubber, he found that it was charged with ease. In this case it was plain, that the very same fire which left the outside coating, was conveyed by the way of the rubber, the globe and the conductor, and the wire of the fire into the inside. This new theory of charging the Leyden phial led Dr. Franklin to observe a greater variety of facts, relating both to charging and discharging it, than other philosophers had attended to. This maxim, that whatever the phial takes in at one surface it loses at the other, led Dr. Franklin to think of charging several phials together with the same trouble, by connecting the outside of one with the inside of another; whereby the fluid that was driven out of the first would be received by the second, &c. By this means he found, that a great number of bottles might be charged with the same labour as one only; and that they might be charged equally high, were it not that every bottle receives the new fire, and loses its old with some reluctance, or rather gives some small resistance to the charging. On this principle he constructed an electrical battery.

When Dr. Franklin first began his experiments upon the Leyden phial, he imagined that the electric fire was all crowded into the substance of the non-electric, in contact with the glass; but he afterwards found that its power of giving a shock lay in the glass itself, and not in the coating, by the following ingenious analysis of the bottle. In order to find where the strength of the charged bottle lay, he placed it upon glass; then first took out the cork and the wire, and finding the virtue was not in them, he touched the outside coating with one hand, and put the finger of the

other into the mouth of the bottle; when the shock was felt quite as strong as if the cork and wire had been in it. He then charged the phial again, and pouring out the water into an empty bottle, insulated, expected that, if the force resided in the water, it would give the shock, but he found it gave none. He then judged that the electric fire must either have been lost in decanting, or must remain in the bottle; and the latter he found to be true; for, filling the charged bottle with fresh water, he found the shock, and was satisfied that the power of giving it resided in the glass itself. The same experiment was made with panes of glass, laying the coating on lightly, and changing it as the water had been before changed in the bottle, and the result was precisely the same. He proved in other ways that the electric fire resided in the glass. Franklin's Letters and Observations, &c. Priestley's Hist. of Electricity, vol. i. p. 191, &c.

From the above account of Dr. Franklin's method of analysing the Leyden phial, the manner of charging and discharging it, and the reason of the process, are easily understood. Thus, if a coated phial be placed near the prime conductor, so that the knob of its wire may be in contact with it; and the winch of the machine be turned, the index of the electrometer, fixed to the conductor, will gradually rise as far as go nearly, and then rest; which shews that the phial has received its full charge; then if the discharger be held by its glass handle, and one of its knobs be applied to the outside coating of the phial, and the other be brought near the knob of the wire, or near the prime conductor that communicates with it, a report will be heard, and luminous sparks will be discovered between the discharger and the conducting substances communicating with the sides of the phial, and by this operation the phial will be discharged. If, instead of using the discharger, a person touches the outside of the phial with one hand, and brings the other hand near the wire of the phial, the same spark and report will be observed, and a shock will be felt, that affects the wrists and elbows; and, when the shock is strong, the breast likewise; and a shock may be given to any single part of the body, if that part alone be brought into the circuit. If a number of persons join hands, and the first of them touches the outside of the phial, and the last touches the wire communicating with the inside, they will all feel the shock at the same time. If the coated phial be held by the wire, and the outside coating be presented to the prime conductor, it will be charged as readily, only with this difference, that in this case the outside will be positive, and the inside negative; and if the prime conductor, by being connected with the rubber of the machine, be electrified negatively, the phial would be charged in the same manner; but the side that touches the conductor would be electrified negatively, and the opposite side would be electrified positively. But if the phial be insulated, and the same process repeated, the index of the electrometer will soon rise to 90°, yet the phial will remain uncharged; because the outside, having no communication with the earth, &c. cannot part with its own electricity, and, therefore, the inside can acquire no additional quantity; but when a chain, or any other conductor, connects the outside of the phial with the table, the phial may be charged as before. Moreover, if a phial be insulated, and one side of it, instead of being connected with the earth, be connected with the insulated rubber, whilst the other side communicates with the prime conductor, the phial will be expeditiously charged; because, whilst the rubber exhaults one side, the other side is supplied by the prime conductor; and in this way the phial is charged with its own electricity; or the natural

electric matter of one of its sides is thus thrown on its other side. This last experiment may be diversified, by insulating the phial, and placing it, with its wire, at the distance of about half an inch from the prime conductor, and holding the knob of another wire at the same distance from its outside coating; then turning the winch of the machine, and a spark will be observed to proceed from the prime conductor to the wire of the phial, and another spark will pass at the same time from the outside coating to the knob of the wire presented towards it; and thus it is seen, that as a quantity of the electric matter is entering the inside of the phial, an equal quantity of it is leaving the outside. If the wire presented to the outside of the phial be pointed, it will appear illuminated with a *flar*; but if the pointed wire be connected with the coating of the phial, it will appear illuminated with a *brush* of rays. See CHARGE, ELECTRICAL Experiments, &c. ELECTRICITY, ELECTROMETER, &c.

Mr. Cavallo has described the construction of a phial, which, when charged by an electrical kite, in examining the state of the clouds, or in any other way, may be put into the pocket, and which will retain its charge for a considerable time. Besides the coating on the inside and outside, which this phial has like others of the same kind, a glass tube open at both ends is cemented into its neck, and passes, within the phial, having a small wire fastened to its lower extremity, which touches the inside non-electric coating. The wire, with the knob of this phial, is cemented into another glass tube, which is nearly twice as long, and smaller than the tube cemented into the neck of the phial. The wire is cemented in such a manner, that only its knob projects out of one end, and a small length of it out of the other end of the tube. If this piece, with the wire, be held by the middle of the glass tube, it may be put in or out of the tube, which is in the neck of the phial, so as to touch the small wire at the lower extremity of it; and this may be done without discharging the phial, if it be charged. A phial of this kind has been kept in a charged state for six weeks. Cavallo's Elect. p. 340. See CONDUCTOR.

We shall close this article with an account of the method by which Mr. Cavallo repairs coated phials, that have been cracked or perforated, either by a spontaneous discharge, or other accident. He removes the outside coating from the fractured part, and then makes it moderately hot by holding it to the flame of a candle; and whilst it remains hot, he applies burning sealing-wax to the part, so as to cover the fracture entirely; taking care that the thickness of this wax coating may be greater than that of the glass. Lastly, he covers all the sealing-wax, and also part of the surface of the glass beyond it, with a composition made with four parts of bees' wax, one of resin, one of turpentine, and a very little oil of olives. This he spreads upon a piece of oiled silk, which he applies in the manner of a plaster. In this way several phials have been so effectually repaired, that, after being frequently charged, they were at last broken by a spontaneous discharge, but in a different part of the glass. Phil. Trans. vol. lxxviii. part ii. p. 1011.

LEYGAGER is used for wager of law.

LEYMEN, or LEINEN, in Geography, a town of Germany, in the palatinate of the Rhine; eight miles S. of Heidelberg.

LEYPÄ, or LEIPPA, a town of Bohemia, in the circle of Leitmeritz; 20 miles N.E. of Leitmeritz. N. lat. 50° 39'. E. long. 14° 43'.

LEYRE, a town of Spain, in Navarre; eight miles N.E. of Sanguesa.

LEYRIA, a city of Portugal, in the province of Estremadura, the see of a bishop, erected in 1545; containing a glass-house built by Englishmen, and about 3500 inhabitants. Near it, on an eminence, is an ancient castle built by the Moors; 57 miles N.N.E. of Lisbon. N. lat. 39° 59'. E. long. 8° 34'.

LEYSE, a town of Prussia, in Ermeland; 18 miles N.E. of Heilsberg.

LEYSENER, in *Botany*, so denominated by Linnæus, in honour of Frederick William Von Lésyer, author of the *Flora Halensis*, published in 1761, in one volume octavo. This is a synopsis of the plants found about Hall in Saxony, disposed according to the Linnæan system, with scarcely any synonyms. The number of species is only 1122, embracing few novelties or rarities, and bearing a great analogy to the lowland Flora of Britain. Haller, however, in his *Bibl. Bot.* v. 2. 510, terms it "a rich Flora, with original remarks, as well as new plants." The most original part seems, in our opinion, a chronological and local distribution of the plants, inserted by way of appendix. A second edition appeared in 1783.—*Linn. Gen.* 431. *Schreb.* 562. *Willd. Sp. Pl.* v. 3. 2132. *Mart. Mill. Dict.* v. 3. *Ait. Hort. Kew.* v. 3. 229. *Thunb. Prodr.* 160. *Juss.* 179. *Lamarck. Illustr.* t. 688. *Gært. t.* 173. (*Asteropterus*; *Vall. Mem. de l'Acad. des Sc.* 1720. *Gært. 460. t.* 173.) *Class and order, Syngnesia Polygamia-superflua. Nat. Ord. Compositæ Discoideæ, Linn. Corymbifera, Juss.*

*Gen. Ch. Common Calyx* ovate, imbricated; scales obtuse, concave, scarious. *Cor.* compound, radiated; florets of the disk several, perfect, tubular, funnel-shaped, five-cleft, nearly erect; those of the radius several, ligulate, lanceolate, entire. *Stam.* (in the perfect florets) Filaments five, capillary, very short; anthers united into a cylindrical tube. *Pist.* (in the same) Germen small; style thread-shaped; stigma notched. In the female ones the style is shorter, and the stigma more divided. *Peric.* none, except the unchanged calyx. *Seeds*, in both kinds of florets, solitary oblong; down, in those of the disk, long, of five feathery bristles, surrounding a very short chaffy crown; in those of the radius the feathery bristles are wanting. *Recept.* naked in the disk, the florets of the circumference only being separated by narrow chaffy scales.

*Obs.* In *Leysera paleacea* the feathery bristles of the radius are wanting. Gærtner restrains the genus of *Leysera* to such species, keeping Vaillant's name *Asteropterus* for those which have the two kinds of seed-down as above described; but such a distinction appears to us, as it did to Linnæus, merely to separate a very natural genus, and it serves, among many other instances, displayed in this part of Gærtner's admirable work, to prove that technical characters must never be followed, without taking natural ones as a clue.

*Eff. Ch.* Receptacle chaffy in the circumference. Seed-down chaffy; in the florets of the disk mostly feathery also. Calyx scarious.

Linnæus has three species of this genus.

1. *L. gnaphalodes*. *Linn. Sp. Pl.* 1249. *Levf. Hall. ed.* 2; frontispiece, inscribed "unicum præmium, sed immortale." (After æthiopicus, stoechadis foliis, flore aureo; *Herm. Lugd. Bat.* 68. t. 71.)—Leaves linear-awlshaped, downy and glandular. Calyx-scales lanceolate.—Native of the Cape of Good Hope, as are all the known species hitherto discovered. The stem is shrubby, determinately branched, leafy, downy. Leaves copious, spreading every way, feathered, brittle-shaped, hardly an inch long, downy, as well as besprinkled with little prominent glandular bristles. Flowers mostly terminal, solitary, on long slender stalks, with yellow

rays, and a shining membranous calyx. The feathery down of the seeds is very conspicuous among the numerous florets of the disk.

2. *L. Callicornia*. *Linn. Mant.* 286. (*Calicorni gnaphaloides*; *Burm. Prodr.* 24. *Hieraciæ penularis* genus, *cordis folio, æthiopicum, feminum pappi densius radiatis*; *Pluk. Mant.* 103. *Phyt. t.* 350. f. 4.)—Leaves linear-threadshaped, rough. Scales of the calyx acute. Flowers nearly sessile. This differs at first sight from the former in its sessile flowers, solitary at the summit of each branch, and the scales of the calyx are more pointed.

3. *L. paleacea*. *Linn. Syst. Veg. ed.* 13. 641. ed. 14. 771. (*L. ericoides*; *Berg. Cap.* 204. *Relbania paleacea*; *L'Herit. Ser. Angl.* 24. *Thunb. Prodr.* 146. *Willd. Sp. Pl.* v. 3. 2137.)—Leaves linear, channelled, downy. Calyx sessile, turbinate; its inner scales thin and pointed. Feathery down wanting. Marginal scales of the receptacle surmounting the florets.—The leaves of this are not so slender as either of the former, being triangular, furrowed above, very cottony, but not glandular. Flowers sessile at the end of each branch, solitary. Outer scales of the calyx less scarious than in the former. On account of the want of the feathery seed-down, M. P. Heritier referred this species to his genus *Relbania*, which is rather a heterogeneous assemblage. In this, however, he is followed by Thunberg and Willdenow, who also agree in removing the Linnæan *Stabelina gnaphaloides* to *Leysera*, a measure which seems to us rather unnatural.

Thunberg adds seven more species to this genus, the specific characters of which are given in his *Prodr.*, but nothing more is known concerning them. They are named *ciliata, incana, arctostoides, Pilosella, ovata, picia, and polifolia*.

LEYTA, in *Geography*, one of the Philippine islands, about 250 miles in circumference; the soil is so fertile as to yield two hundred fold; the mountains abound in deer, cows, wild hogs, and fowls; cocoas grow spontaneously; the air is pure and healthy, and more temperate than at Luçon. The inhabitants are mild and peaceable in their disposition, and hospitable to strangers. Their number is estimated to be about 9000, who pay tribute in wax, rice, or cloth. N. lat. 10° 50'. E. long. 124° 40'.

LEZAIJSKO, a town of Austrian Poland, in Galicia; 56 miles W.N.W. of Lemberg.

LEZANDRIEUX, a town of France, in the department of the North Coasts, and chief place of a canton, in the district of Lannion, four miles E. of Treguier. The place contains 1763, and the canton 12,289 inhabitants, on a territory of 142½ kilometres, in six communes.

LEZERS, an Indian nation, which inhabits between the mouth of the Ohio and Wabash rivers. They can furnish 300 warriors.

LEZIGNAN, a town of France, in the department of the Aude, and chief place of a canton, in the district of Narbonne. The place contains 1505, and the canton 6827 inhabitants, on a territory of 270 kilometres, in 17 communes.

LEZOUX, a town of France, in the department of the Puy-de-Dôme, and chief place of a canton, in the district of Thiers; seven miles W.S.W. of Thiers. The place contains 3307, and the canton 10,581 inhabitants, on a territory of 197½ kilometres, in 12 communes.

LGOV, a town of Russia, in the government of Kurk. N. lat. 48°. E. long. 35° 54'.

LHOTA, a town of Bohemia, in the circle of Konigin-gratz; six miles S.E. of Trautenau.

LHOTKA, a town of Bohemia, in the circle of Konigin-gratz; 14 miles W. of Konigin-gratz.

LIADOVA, a town of Moldavia, on the Dniester; 56 miles E.N.E. of Choczim.

LIASON, *Fr.* in *Musci*, connection, relation, combination. See RELATIVE.

LIASKOI, in *Geography*, a town of Russia, in the province of Uding, on the Vm; 48 miles E. of Yarensk.

LIAM, a town of Lower Siam, on the E. side of the gulf. N. lat. 12° 35'. E. long. 102° 18'.

LIAMONE, a river of Corfica, which runs into the sea; 10 miles N. of Ajaccio. It gives name to one of the two departments into which Corfica is divided; the other being Golo. It is formed by the southern part of the island, in N. lat. 41° 30', containing 149 square leagues, and 63,347 inhabitants. It is divided into three circles, *viz.* Vico, containing 10,049 inhabitants; Ajaccio, 26,918; and Sartone, including 26,350 inhabitants. In the valleys and acclivities of the hills, the soil is fertile, yielding grain, fruits, pastures, and, in some districts, delicious wines.

LIAM-PO. See NING-RO.

LIAMSA, a town of Russia, in the government of Archangel, on the coast of the White sea; 56 miles N.N.W. of Oueg.

LIANCOURT, a town of France, in the department of the Oise, and chief place of a canton, in the district of Clermont; four miles S. of Clermont. The place contains 962, and the canton 10,365 inhabitants, on a territory of 125 kilometres, in 22 communes.

LIANGA, a town on the E. coast of Mindanao. N. lat. 8° 21'. E. long. 126° 10'.

LIANG-CHAN, a town of Corea; 40 miles S.S.E. of Kang-teheou.

LIANGDAL, a river of Sweden, which rises in the province of Harjedalen, and runs into the gulf of Bothnia, near Sundfval.

LIAN-TCHUEN, a town of Corea; 25 miles E.N.E. of Haimen.

LIAR-DSAKE, a lake of Thibet, about 30 miles in circumference. N. lat. 34° 34'. E. long. 90° 44'.

LIATRIS, in *Botany*, a name of whose meaning or origin we are not able to discover any thing satisfactory. *Gært.* t. 167. *Schreb.* 542. *Willd. Sp. Pl.* v. 3. 1634. *Mart. Mill. Dict.* v. 3. (Suprago; *Gært.* v. 2. 402. *Anonymous*, n. 309; *Walt. Carol.* 196. *Cirsium*; *Dill. Eth.* t. 71, 72. See *Serratula*; *Juff.* 174.)—Class and order, *Syngenesia Polygamia-aqualis*. *Nat. Ord. Compositae capitatae*, *Linn. Cinarocephales*, *Juff.*

*Gen. Ch.* Common Calyx oblong, imbricated, of numerous, somewhat ovate, unarmed, coloured scales. *Cor.* compound, uniform, tubular; florets are perfect and equal, monopetalous, funnel-shaped; their tube inflexed; limb in five recurved segments. *Stam.* Filaments five, capillary, very short; anthers united into a cylindrical tube. *Pist.* Germen to each floret, oblong; style thread-shaped, very long, divided as far as the top of the stamens, straight; stigmas rather acute. *Peric.* none, except the permanent unaltered calyx. *Seeds* solitary, angular; down sessile, feathery, sometimes coloured. *Recept.* naked, flat.

*Eff. Ch.* Receptacle naked, Calyx oblong, imbricated, unarmed, coloured. Down leathery.

This genus appears to have been originally separated from *Serratula* by *Gærtner*, who altered the name by which he at first distinguished it, *Suprago*, to that it now bears. *Serratula* differs from it in having a fealy or hairy receptacle, as well as in habit. Eight species are defined by *Willdenow*, of which the following are the most characteristic and remarkable.

*L. scariosa*, *Willd.* n. 2. (*Serratula scariosa*; *Linn.*

*Sp. Pl.* 1147. *Eupatorio adinis americana bulbosa, floribus scariosis calycibus contectis*; *Pluk. Phyt.* t. 177. f. 4.)

—Leaves lanceolate, tapering at each end, rough-edged. Flowers on long bracteated stalks. Calyx-scales obovate, spreading.—Native of North America; sometimes seen with us in curious gardens, where it is a hardy perennial. *Root* a bulb-shaped tuber. *Stem* three or four feet high, leafy, finely hairy, racemose at the upper part, each flower supported by a stalk from two to four inches long, bearing a few leafy bractes. The stigmas are long, purplish, as well as the florets. *Calyx-scales* more or less obtuse, leafy, widely spreading.

*L. elegans*, *Willd.* n. 3. (*Stachelina elegans*; *Walt. Carol.* 202. *Serratula speciosa*; *Ait. Hort. Kew.* v. 3. 138.)—Leaves linear, dotted. Spike very long and dense. Calyx-scales lanceolate, acute, hairy; the innermost elongated, coloured, somewhat toothed. Florets few.—Gathered by *Bartram*, in Georgia, in 1765; by *Walter* in Carolina. The upper stem-leaves are widely spreading, or reflexed; lower longer, more distant and upright; all finely dotted on both sides. Spike long, dense, erect, slender, of numerous, nearly sessile, bracteated flowers, whose long, leafy, fine pink, inner scales of the calyx are very beautiful.

*L. pilosa*, *Willd.* n. 4. (*Serratula pilosa*; *Ait. Hort. Kew.* v. 3. 138.)—Leaves linear, hairy, somewhat dotted. Cluster long, loose, hairy. Bractes and calyx-scales obtuse, fringed.—Native of North America, from whence it was introduced, in 1783, into Kew garden, where we gathered it in flower two years after. It is perennial and hardy, blooming in the autumn. As there is no description nor figure extant, the following may be acceptable. The stem is three feet high, slender, leafy, angular, clothed with longish scattered hairs, at least in the upper part. Leaves narrow, reflexed, fringed with similar hairs, and irregularly dotted on both sides; the upper ones dilated at the base, and embracing the stem. Cluster terminal, simple, long, loose, leafy, slightly hairy. Flower stalks about an inch long, axillary, bearing at their upper part two or three short, obtuse, fringed, dotted bractes, resembling the lower scales of the calyx; whose inner-scales are gradually longer, with a membranous, fringed, white or reddish edge. Florets and stigmas pink.

We cannot but lament, that while so many well-known plants are figured over and over again in every publication, such curious and beautiful species as the two last should remain neglected and unknown.

*L. spicata*, *Willd.* n. 6. (*Serratula spicata*; *Linn. Sp. Pl.* 1147. *Cirsium tuberosum, lacteae capitulis spicatis*; *Dill. Eth.* 85. t. 72. f. 83.)—Leaves linear, minutely dotted, fringed at the base. Spike leafy; dense above. Calyx-scales obtuse, smooth.—Native of various parts of North America, from whence it was brought to the English gardens about eighty years ago, and still remains at Kew. The nearly sessile flowers, and smooth-edged calyx, distinguish it from the last, to which it is otherwise nearly allied.

*L. odoratissima*, *Willd.* n. 5. (*Anonymous odoratissimus*; *Walt. Carol.* 198.)—Leaves elliptic-oblong, smooth; the upper ones heart-shaped, clasping the stem. Panicle corymbose, spreading. Calyx-scales obovate, glandular.—Gathered by *Walter* in Carolina, from whence it was brought by the late Mr. *Frazer* in 1787. This species is remarkable for its fine scent when dried, which resembles that of the *Woodruff*, and *Holcus odoratus*. The radical leaves are stalked, three or four inches long, nearly elliptical; those of the stem numerous, much smaller. Flowers small, purple, very numerous, in a smoothish, spreading, bracteated, corymbose panicle. Florets not numerous.

**LIBA**, in *Geography*, a town of Bohemia, in the circle of Saatz; 10 miles E. of Eger.

**LIBAN**, a town of Bohemia, in the circle of Boleslaw; 12 miles E. S. E. of Jung-Buntzel.

**LIBANIUS**, in *Biography*, a celebrated Greek sophist, or rhetorician, was born of an ancient family at Antioch, about the year 314. He devoted himself from his youth to the interests of literature, and pursued his studies at Athens. Having finished his education he collected disciples, and made himself known by various rhetorical compositions. His reputation was so high at Constantinople, that some other professors, jealous of his fame, procured his banishment on the charge of magic. He then went to Nicomedia, where he obtained a great number of disciples, among whom, in a private manner, was Julian, afterwards denominated the Apostate. He finally returned to Antioch, where he spent the remainder of his day. About the year 360, he was preceptor to Basil and Chrysofom, persons afterwards very celebrated in the church, though he was always zealously attached to the ancient religion; and on the accession of Julian, he was one of the first whom that emperor invited to be near his person. He declined the honours intended him, preferring a life of privacy to the bustle of a court. He was, however, warmly attached to a prince who patronized his studies, and supported the same religious cause; and was enabled, by the influence which he had over him, to soften many of the emperor's resentments. Julian admitted him to the equality of a friend, and is thought to have derived some assistance from him in his compositions. He survived to an advanced age, but the time of his death is not known. The writings of Libanius were very numerous, consisting chiefly of orations, declamations, dissertations, and epistles; which are characterized by Gibbon as, "for the most part, the vain and idle compositions of an orator who cultivated the science of words;" yet he admits that he had merit, and that his correspondence was various and elaborate; "he praised the virtues of his own times; he boldly arraigned the abuses of public and private life; and he eloquently pleaded the cause of Antioch against the just resentment of Julian and Theodosius." Some of the works of Libanius, consisting of his orations, declamations, &c., were published in two volumes, folio, in Greek and Latin, in the years 1626 and 1627; but the most complete collection of his epistles is that published at Amsterdam in 1738. A volume, containing seventeen of his harangues, from the library of St. Mark, was printed at Venice in 1755. In reference to the conclusion of this writer's life, Gibbon observes, "it is the common calamity of old age to lose whatever might have rendered it desirable; but Libanius experienced the peculiar misfortune of surviving the religion and the sciences, to which he had consecrated his genius. The friend of Julian was the indignant spectator of the triumph of Christianity; and his bigotry, which darkened the prospect of the visible world, did not inspire Libanius with any lively hopes of celestial glory and happiness." The judicious and excellent Lardner has translated the whole of Libanius's oration to the emperor Theodosius, every part of which, he says, is of importance to Christians. The occasion of this oration was, that in the reign of Theodosius, several heathen temples had been pulled down and destroyed by the monks, with the consent or connivance, as Libanius thought, of the bishops, and without the orders of the emperor to that purpose. Of this Libanius complains and implores the protection of Theodosius, that the temples may be preserved. Dr. Lardner, therefore, gives the oration at length, to shew that the testimony of this heathen writer went directly to

prove the divine origin of Christianity. And he concludes by maintaining, that the greatness and splendour to which the Christian church had attained from small beginnings, by the force of truth against worldly terrors and allurements, was a greater wonder and a work of greater power than the magnificence of Rome and the grandeur of her empire. Libanius has given an interesting detail of the private life of Julian, quoted and referred to by Gibbon; the mention of which affords us an opportunity of making an additional reference to the article JULIAN in our last volume. The works of Dr. Lardner should have been cited as containing a summary of the arguments respecting the extraordinary interpositions that prevented this emperor from rebuilding the Jewish temple. See Lardner's testimonies of Ancient Heathens, vol. iv. or vol. viii. edit. 1788. Gibbon, vol. iv. Moreri.

**LIBANIUS, GEORGE**, who flourished in the sixteenth century, was descended from a respectable family at Lignitz, in Poland, of which place he was a native. He pursued his studies for several years in the most celebrated German universities; and coming to reside at Cracow, he was appointed one of the professors in the principal college of that city. He is said to have been the first person who introduced there the study of the Greek language. He published several works; as "Æconomicorum Aristotelis Libri Græcis et Latinis Annotationibus illustrati;" "Carmina Sibyllæ Erithrææ, &c.;" "Paræclis, id est adhortatio ad Græcarum Literarum studiosius, habita Cracovæ;" "De Musica Laudibus Oratio, &c.;" He also compiled an "Anthology;" or choice Collections from the Works of St. Basil, St. Gregory Nazianzen, and St. Chrysofom. Moreri.

**LIBANOMANTIA**, *Λιβανομαντεία*, in *Antiquity*, a species of divination performed with frankincense; which, if it presently caught fire, and sent forth a grateful odour, was esteemed a happy omen, and *vice versa*.

**LIBANOTIS**, in *Botany*, the ancient appellation of a plant, supposed by some to have been the name of a boy, changed into the plant in question; but the most evident and generally received etymology is from *λίβανος*, *frankincense*, which the root is said to resemble in scent. The *λίβανός* of Dioscorides appears to be our Rosemary, as has been usually supposed; which shrub is by the modern Greeks called *δευδελολίβανος*, or Tree Libanos. *Libanotis* however has at different times, been employed to designate various umbelliferous plants, of an aromatic quality, and generally of mountain origin, which may have been found under the genera of *Ahamanota*, *Cachrys*, *Bupleurum*, &c.

**LIBANUS**, in *Geography*. See **LEBANON**.

**LIBATION, LIBATIO**, a ceremony in the heathen sacrifices, wherein the priest spilt some water, wine, milk, or other liquor, in honour of the deity to whom the sacrifice was offered; after having first tasted it himself.

Alexander is said to have sacrificed a bull to Neptune; and, for an offering to the sea-gods, to have thrown the golden vessels used for the libation into the sea.

Libations were also in use under the law of Moses, being enjoined by God in Exodus xxix. and Numbers xv.

**LIBAU**, in *Geography*, a sea-port of the duchy of Courland, situated on the Baltic, built by the Lettonians, and deriving its name, as it is said, from the word "Leepaja," which, in the Lettonian language, signifies a piece of ground planted with linden-trees, suggested by the circumstance that many of these trees formerly grew here. This etymology is further confirmed by the consideration that the Lettonians even now call the town "Leepaja." Some Germans intermixed with the inhabitants of this town in the

13th century, and about the close of the fifteenth, and commencement of the 16th centuries, many of that nation united together, and in 1625 it obtained the privileges of a city. In 1737, the harbour was cleared by Ernest John, and the future accumulation of mud and sand prevented, so that it is now a commodious port for vessels of light burden; a considerable number of which repair hither and are loaded with hemp, linseed, &c. This town was often taken by the Swedes, but ceded to Courland by the peace of 1660; 66 miles W. of Mittau. N. lat. 55° 28'. E. long. 21° 37'. In this part of the Baltic, as well as in the whole province of Courland belonging to Russia, accounts are kept by merchants, as at Riga, in Alberts dollars of eighty ferdings, or of ninety Alberts groschen; but retail traders mostly reckon two guldens of ninety current groschen, four of which are equal to three Alberts groschen. The coins chiefly circulating here are Dutch ducats, and Alberts dollars; and also pieces coined in the country of the same standard and value with these two coins. The ferding is an old silver coin; but the grosche is imaginary. The Russian coins are also current here. (See RIGA.) The last of wheat, rye, barley or pease, contains 48 loafs; that of oats and malt 60 loafs, which are equal to 106 English bushels; so that a loaf of wheat contains about 10½ English quarters, and a last of oats 13½ English quarters: one hundred lasts of falt are equal to 11,110 English bushels. Libau exchanges with London at four Alberts dollars fifty groschen, more or less, for 1*l.* sterling, at three months date. The old flyle is still used at Libau. Kelly's Un. Cambit, vol. 1.

**LIBAVIUS, ANDRECO,** in *Biography*, a physician and chemist, was born at Hall, in Saxony. He was professor of history and poetry at Jena, in 1588. But he removed to Rothenburg, on the Tauber, in 1591, and to Coburg, in Franconia, in 1605, in consequence of an appointment to the office of principal of the college of Calmir, at that place. He died at Coburg in 1616. Libavius obtained a considerable reputation in his time by his chemical works, having pursued that science upon better principles than most of his contemporaries. He employed many chemical preparations in medicine; nevertheless, he avoided the violence of Paracelsus and his disciples, whose principles he often refuted, and against whom he frequently defends the doctrines of the Galenical school. But, like the chemical philosophers of the age, he did not altogether escape the delusions of alchemy. He left his name long attached, in the laboratories, to a particular preparation of tin with muriatic acid, which was called "the fuming liquor of Libavius." It is unnecessary to enumerate the titles of his many works, which have now become obsolete, and are almost forgotten. His last work, published at Francfort in 1615, under the title of "Examen Philosophiz Novæ, quæ veteri abrogandæ; opponitur;" folio, is remarkable for the first mention of the transfusion of blood from the vessels of one living animal to those of another, of which he speaks with great confidence. The suggestion, however, was not submitted to the test of experiment until the middle of the same century, when the subject made a great noise throughout Europe, and many physicians anticipated from it no less than a remedy against all diseases; nay, some of them felt a confident expectation of rendering life perpetual. But these notions were presently confuted by the numerous fatal terminations of the experiment. See Eloy Dict. Hist. Haller. Bibl. Med.

**LIBAVIUS, Liquor of.** See LIQUOR.

**LIBEL, Famous Libellus,** a writing or report, unlawfully published abroad, containing injurious reproaches, or accusations, against the honour and reputation of any person, par-

ticularly of a superior or governor: or, it is defined to be a malicious defamation of any person, expressed either in printing or writing, signs or pictures, to asperse the reputation of one that is alive, or the memory of one that is dead. According to judge Blackstone, libels, in their most extensive sense, signify any writings, pictures, or the like, of an *immoral* or *illegal* tendency. Considered particularly as offences against the public peace, they are malicious defamations of any person, and especially a magistrate, made public by either printing, writing, signs, or pictures in order to provoke him to wrath, or expose him to public hatred, contempt, or ridicule.

Platina is of opinion, that a writing, how injurious soever it is, cannot be called a libel, if the author's name be to it. Libellers, among the ancient Romans, were punished with death, but in after-times they were only whipped. Augustus ranked *fanctos libellos*, detamatory libels, among the crimes *lese majestatis*, of high treason; and under the emperor Valentinian it was made capital, not only to write, but to publish or even omit destroying them. F. Baldwin has published a comment on the imperial laws against libels. Scandalous pictures are reckoned amongst libels.

A libel, the lawyers say, may be either in *scriptis*, or *sine scriptis*: in *scriptis*, when a writing is composed, or published to another's disgrace; which may be done either *verbis aut cantalensis*; as where this is maliciously repeated, or sung, in the presence of others: or else *traditione*, when the libel, or any copy of it, is delivered out, to scandalize the party. 3 Inst. 174.

A *libel sine scriptis*, may be twofold. 1. *Picturis*, as to paint the party in a shameful or ignominious manner: or, 2. *Signis*, as to fix a gallows, or other ignominious signs, at the door of the party, or elsewhere.

Where a writing inveighs against mankind in general, or against a particular order of men, this is no libel; in order to make it a libel, it must descend to particulars and individuals. (3 Salk. 224.) But a general reflection on the government is a libel, though no particular person is reflected on; and the writing against a known law is held to be criminal. (4 St. Tr. 672. 903.) According to C. J. Holt, scandalous matter is not necessary to make a libel; it is enough if the defendant induces an ill opinion to be had of the plaintiff, &c. And if a man speak scandalous words, unless they are put in writing, he is not guilty of a libel; for the nature of a libel consists in putting the infamous matter into writing. (2 Salk. 437. 3 Salk. 226.) A defamatory writing, expressing only one or two letters of a name, in such a manner, that from what goes before and follows after it may be understood, by the natural construction of the whole, to signify and point at such a particular person, is as properly a libel as if the whole name were expressed at large. (1 Hawk. P. C. c. 73. f. 4.) On application for information against this offence, some friend to the party complaining should in such case state by affidavit his having read the libel, and that he understands and believes it to mean the party. (3 Bac. Abr. 12.) And in the case of actions for libels by signs or pictures, it seems necessary always to shew, by proper innuendoes and averments of the defendant's meaning, the import and application of the scandal, and that some special damage has followed; otherwise it cannot appear that such libel by picture was understood to be levelled at the plaintiff, or that it was attended with any actionable consequences. (Bl. Com. iii. c. 8.) Although a private person or magistrate be dead at the time of making the libel, yet it is punishable, as it tends to a breach of the peace. (Hob. 215. 5 Co. 125. 1 Hawk. P. C. c. 73.) But an indictment for publishing libellous matter

matter reflecting on the memory of a dead person, not alleging that it was done with a design to bring contempt on the family of the deceased, and to stir up the hatred of the king's subjects against them, and to excite his relations to a breach of the peace, cannot be supported; and judgment was in this case accordingly arrested. (4 Term Rep. 126.) No writing is esteemed a libel, unless it reflect upon some particular person. And a writing full of obscene ribaldry is not punishable by any prosecution at common law; but the author may be bound to good behaviour, as a person of evil fame. (1 Hawk. P. C. c. 73.) Printing or writing may be libellous, though the scandal is not directly charged, but obliquely and farcally. Id.

It is certain that he who composes a libel, or procures another to compose it, and also he who publishes or procures another to publish it, is in danger of being punished for it; and it is said not to be material, whether he who disperses a libel know any thing of the contents or effect of it, or not; for nothing would be more easy than to publish the most virulent papers with the greatest security, if concealing the purport of them from an illiterate publisher would make him safe in dispersing them. (1 Hawk. c. 70.) It hath also been said, that if he who hath either read a libel himself, or hath heard it read by another, do afterwards maliciously read or repeat any part of it in the presence of others, or lend or shew it to another, he is guilty of an unlawful publication of it. (Id.) It hath also been holden, that the copying of a libel shall be a conclusive evidence of the publication of it, unless the party can prove that he delivered it to a magistrate to examine it. (Id.) When any one finds a libel, if it be against a private person, he ought to burn it, or deliver it to a magistrate; and where it concerns a magistrate, he should deliver it presently to a magistrate. (5 Rep. 125.) If a libel be found in a house, the master cannot be punished for framing, printing, and publishing it; but it is said he may be indicted for having it, and not delivering it to a magistrate (1 Vent. 31.); or it may, in some cases, be considered as evidence of his being the author or publisher. (2 Salk. 418.) It hath been ruled, that the finding of a libel on a bookfeller's shelf is a publication of it by the bookfeller, and that it is no excuse to say, that the servant took it into the shop without the master's knowledge; for the law presumes the master to be acquainted with what the servant does. (1 Seff. C. 33. R. v. Dodd. 10 G.) The sale of the libel by a servant in a shop is *prima facie* evidence of publication, in a prosecution against the master; and is sufficient for conviction, unless contradicted by contrary evidence, shewing that he was not privy, nor in any way assenting to it. 4 Term Rep. 126. 5 Burr. 2686. 7. 1 Hawk. P. C. c. 73.

It is said to be immaterial, on a criminal prosecution, with respect to the essence of a libel, whether the matter of it be true or false, or whether the party against whom it is made be of good or bad fame; for in a settled state of government, the party grieved ought to complain for any injury done to him, in the ordinary course of law, and not by any means to revenge himself either by the odious course of libelling or otherwise. (5 Co. 125.) But this is to be understood, when the prosecution is by information or indictment; but in an action on the case, which is to repair the party in damages, the defendant may justify the truth of the facts, and shew that the plaintiff hath received no injury. Although it has been held, agreeably to the doctrine maintained by lord chief justice Mansfield, for at least two centuries, that the truth of a libel is no justification in a criminal prosecution, yet in many instances it is considered as an extenuation of the offence; and the court of king's bench

has laid down this general rule, *viz.* that it will not grant an information for a libel, unless the prosecutor who applies for it makes an affidavit, asserting directly and pointedly that he is innocent of the charge imputed to him. This rule, however, may be dispensed with in particular cases; as if the person libelled resides abroad, or if the imputations of a libel are general and indefinite, or if it is a charge against the prosecutor for language which he has held in parliament. Where, on application for an information, the truth of the libel is not denied, the court, except in the instances above mentioned, will leave the injury to be remedied in the ordinary course of justice by action or indictment. (Stra. 493.) But the court will not grant this extraordinary remedy by information, nor should a grand jury find an indictment, unless the offence be of such signal enormity, that it be reasonably construed to have a tendency to disturb the peace and harmony of the community. (1 Hawk. P. C. c. 73.) There are authorities, that truth is not a justification even in an action for a libel; and a very learned writer seems to doubt whether such a plea would now be admitted by the court, if the accusation in the libel did not amount to an indictable offence. (3 Woodd. 182.) It seems, however, that the contrary is the prevalent opinion; and that in every action for a libel, if specific instances can be stated upon the record, so as to support the general charge of the libel, the courts would determine them to be a sufficient justification of the defendant. 1 Term Rep. 748.

The punishment of libellers for either making, repeating, printing, or publishing the libel, is fine, and such corporal punishment (as imprisonment, pillory, &c.) as the court in its discretion shall inflict; regarding the quantity of the offence, and the quality of the offender. (1 Hawk. P. C. c. 73.) If a printer print a libel against a private person, and much more against a magistrate, or against the king and state, he may be indicted and punished for it; nor is it any apology to say, that it was done in the way of trade, or to maintain a family. (1 St. Tr. 982. 986.) Also, if bookfellers, &c. publish or sell libels, though they know not the contents of them, they are punishable. It has been resolved, that where persons write, print, or sell any pamphlets, scandalizing the public, or any private persons, such libellous books may be seized, and the persons punished by law; and all persons exposing books to sale, reflecting on the government, may be punished; also, writers of news (though not scandalous, seditious, or reflecting on the government, if they write false news) are indictable. St. Tr. 477.

With regard to libels in general, there are two remedies; one by indictment and another by action. The former for the public offence; for every libel has a tendency to break the peace, or to provoke others to break it; which offence is the same, in point of law, whether the matter contained be true or false; and, therefore, the defendant on an indictment for publishing a libel, is not allowed to allege the truth of it by way of justification. In such prosecutions the only facts to be considered are, first, the making or publishing of the book or writing; and secondly, whether the matter be criminal. But in the remedy by action on the case, which is to repair the party in damages for the injury done him, the defendant may, as for words spoken, justify the truth of the facts, and shew that the plaintiff has received no injury at all. Blackst. Com. vol. iii. and vol. iv.

In information and law proceedings, there are two modes of describing a libel; *viz.* by the sense, and by the words; the first is "*cujus tenor sequitur*," and the second "*quæ sequitur in hæc Anglicana verba, &c.*" in which the description

description is by particular words, and of which every word is a mark, so that if there is any variance, it is fatal; in the other description by the sense, it is not material to be very exact in the words, because the matter is described by the sense of them (2 Salk. 660.) It hath been adjudged, that libels, as having a direct and immediate tendency to a breach of the peace, are indictable before justices of the peace. (1 Hawk. c. 8.) A libel must be proved to be written or published in the county laid in the indictment; all matters of crime being local. An information for a libel need not charge the offence to have been committed "vi et armis," or allege that the libellous matter is false. (7 T. R. 4.) The declaration for a libel must lay it to be "of and concerning the plaintiff;" otherwise there can be no judgment. (2 Strange, 934.) A very important subject of litigation has arisen from prosecutions for libels, and particularly for state libels; and that is, whether juries are, or are not, judges of *law* as well as of *fact*. With regard to libels, it had for a long time been the usage for the judge to direct the jury, that if the fact of the publication of the paper charged to be a libel was proved, and if they believed the innuendoes in the indictment, they must find the defendant guilty; without adverting to any other circumstances, such as whether the paper were, in their opinion, a libel, or published with a malicious, seditious, traitorous, &c. intention. The counsel for the defendants in such prosecutions always maintained, that it was the province of the jury to judge whether the paper was a libel (a question of mere law); and also whether it were published with a malicious, seditious, &c. intention, as charged,—a complicated question of law and fact. Mr. (now lord) Erskine was the most strenuous assertor of this latter doctrine; and by the indefatigable exertions of him and the late Hon. Charles Fox, the following act of parliament was obtained with a view expressly of settling this question by legislative authority; and in consequence of it a great, and, as many have deemed it, a very favourable, alteration has taken place in the trials for libels. The statute is that of 32 Geo. III. c. 67. After reciting that doubts had arisen whether on the trial of an indictment or information for making or publishing a libel, where an issue is joined on the plea of not guilty, it were competent to the jury to give their verdict upon the whole matter in issue, it enacts that on every such trial the jury may give a general verdict of guilty or not guilty upon the whole matter; and shall not be required or directed by the court or judge, before whom such indictment or information shall be tried, to find the defendant guilty merely on the proof of the publication by such defendant of the paper charged to be a libel, and of the sense ascribed to the same in such indictment or information. (f. 1.) Provided always, that on every such trial the court or judge before whom such indictment or information shall be tried, shall, according to their or his discretion, give their or his opinion and directions to the jury on the matter in issue between the king and the defendants, in like manner as in other criminal cases. (f. 2.) Provided also, that nothing herein contained shall extend, to prevent the jury from finding a special verdict, in their discretion, as in other criminal cases. (f. 3.) Provided also, that in case the jury shall find the defendant guilty, it shall and may be lawful for him to move in arrest of judgment on such ground, and in such manner, as by law he might have done before the passing of this act.

When a person is brought before the court to receive judgment for a libel, his conduct, subsequent to his conviction, may be taken into consideration, either by way of aggravation or mitigation of his punishment. (3 Term Rep. 432.)

Judge Blackstone observes, that in all the instances where blasphemous, immoral, treasonable, schismatical, seditious, or scandalous libels are punished by the English law, some with a greater, and others with a less degree of severity, the liberty of the press, properly understood, is by no means infringed or violated. See *Liberty of the Press*.

**LIBEL**, or *libellus*, a little book, in the spiritual court signifies the original declaration of any action in the civil law. (Stat. 2 Edw. VI. c. 53.) The libel used in ecclesiastical proceedings consists of three parts. 1. The major proposition, which shews a just cause of the petition. 2. The narration, or minor proposition. 3. The conclusion, or conclusive petition, which conjoins both propositions. Blackll. Com. vol. iii.

**LIBEL**, in the *Law of Scotland*, is used for a criminal accusation or indictment.

**LIBELLA**, in *Natural History*. See **LIBELLULA**.

**LIBELLA**, among the Romans, was the tenth part of the denarius.

**LIBELLATICI**, an ancient kind of apostates from Christianity, under the persecution of Decius; who, to prevent their being obliged to renounce the faith, and sacrifice to idols in public, made application to the magistrates, and abjured their faith in private; obtaining certificates of them, either by intreaty, or by money; by which they were attested to have complied with the orders of the emperor; and were thereby sheltered from any farther molestation on account of their religion.

These certificates were called *libelli*; whence the people who obtained them came to be denominated *Libellatici*.

Others, particularly the centurions of Magedbourg, are of opinion, that the Libellatici were only such as furnished the magistrates with money, to screen them from prosecution, and from being obliged to renounce Christianity.

M. Tillemont retains something of each opinion; he thinks, the Libellatici, applying themselves to the magistrates, bought off the sacrificing and abjuration; and obtained letters, by which they were declared to have renounced Christ, and sacrificed to idols; though, in effect, they had done neither.

**LIBELLULA**, or *Dragon Fly*, in *Entomology*, a genus of the order Neuroptera; the character of which, according to Gmelin, reduced to the arrangement of the "Systema Naturæ," consists in the mouth armed with jaws, more than two in number; lip trisid; antennæ very thin, filiform, and shorter than the thorax; wings expanded; tail (of the male insect) furnished with a forked process.

In this genus the antennæ are very short, being merely a pair of small hairs, the wings large and spreading, and the body lengthened. The libellulæ, or dragon-flies, exhibit an instance scarcely less striking than the butterfly of that dissimilitude in point of form under which one and the same animal is destined to appear in different periods of its existence. Persons not conversant with natural history, would scarcely believe that these brilliant insects, flying with vast strength and rapidity, and pursuing other insects still smaller, after the manner and with the velocity of a hawk, had been inhabitants of the water, in which they resided a considerable time before they had assumed the flying form. The whole tribe, which is divided into sections, and one of which sections is subdivided, is exceedingly ravenous, and generally seen hovering over stagnant waters: the larvæ are six-footed, active inhabitants of the water, furnished with an articulate forspicated mouth; and prey with the utmost rapaciousness upon aquatic insects and the larvæ of others; the pupa resembles the larva, but, in the former state, it has the rudiments of wings. The libellulæ, or dragon-flies, are some-

## LIBELLULA.

times, though very improperly, called horse-flingers. There are nearly sixty species: before, however, we come to the enumeration of these, we may relate some facts common to the tribe itself. The addressees of the male libellula to his female seem carried on in a rough but very efficacious manner. He hovers about on the wing, till the object of his amours makes her appearance; he then watches an opportunity of seizing her by the head with those pincers with which his tail is armed. In this manner he travels through the air, till the female, yielding either to superior strength or inclination, forms her body into a kind of circle, adapted to the purpose of nature; hence the libellule are frequently seen coupled in the air, exhibiting the form of a ring. The female, at a proper period, retires to some stagnant water, where, by the assistance of a flick or reed, she lowers herself down, by moving backwards, till the tip of the tail is immersed a little in the water; she is then seized with a tremor of the body, during which she deposits the egg in the water. In this way the operation is repeated. The tail is withdrawn from the water, by contracting the annuli; and, by the pressure of these upon each other, the egg is gradually forced from the ovary to the extremity of the tail; whence it is separated by shaking that part in the water. The eggs are of a white colour, resembling those produced by the common blow-fly. The larvæ are disgusting in appearance, but beneath the head is placed an instrument excellently adapted for seizing and holding their prey. It is furnished with a forceps at the end, and can be advanced or drawn back with the agility of the human hand! The larva remains in the same state about a year before it attains its full size: when the period of its transformation has arrived, it repairs to the margin of the pond in quest of a convenient situation during the season of its inaction. It there attaches itself to a plant or piece of dry wood, and the skin, which has gradually become parched and brittle, at length splits opposite the upper part of the thorax. Through this aperture the winged insect quickly pushes its way, and being thus extricated from confinement, begins to expand its wings, to flutter, and finally to launch into the air. The complete insect, in its winged state, continues to pursue food similar to that by which it had been supported before, and remains insectivorous. The lepidopterous insects, the butterflies, and phalænae, are defined for the support of the larger libellula, which are a part of those numerous tribes appointed to confine these prolific genera within due bounds. The life of the libellula, in its winged state, is short in comparison with that which it passed in its aquatic form, the frosts of the early autumn destroying all those that have not been devoured by birds in the preceding months. It is impossible not to be struck with wonder in contemplating the changes of the libellula, which, while living in the water, would perish by a long exposure to the air, while the winged insect, having escaped from the pupa, would be destroyed by submersion under the water, of which, not an hour before, it was the legitimate inhabitant.

The species are divided into the sections A and B. Section A. Wings expanded when at rest. The insects of this division are subdivided into a Dorsal division of the lip very minute; and 2 Divisions of the lip equal; constituting the tribe *Æthna* of Fabricius. B. Wings erect when at rest; eyes distinct; outer divisions of the lip bifid. The tribe *Agriion* of Fabricius.

### Species.

Section A. Wings expanded when at rest: a Dorsal division of the lip very minute.

VOL. XX.

4-MACULATA. Lower wings at the base, and all in the middle on the fore-part with a blackish spot; abdomen depressed, downy. It is an European insect, and described by Reaumur.

DEPRESSA. All the wings blackish at the base; abdomen depressed, yellowish at the sides. This also is an European insect; figures and description are given by Edwards and Donovan. The male is of a bright sky-blue, with the sides of the body yellow; the female of a fine brown, with yellowish sides. The wings in both sexes are transparent, except at the shoulders, where they are each marked by a broad bed of brown with a stripe of yellow; the tips of each wing have also a small oblong-square black spot on the outer margin. The larva is of a greyish-brown.

TRIMACULATA. All the wings hyaline, with a ferruginous spot at the base, and band in the middle. It inhabits Carolina.

BIFASCIATA. Wings hyaline, with a brown spot at the base and two bands. It inhabits America. The thorax is villous-brown, with two yellow lines under the wings; abdomen depressed, brown, the sides yellowish.

4-PUNCTATA. Wings white; lower ones black at the base with a yellow line; all with a black dot; abdomen cylindrical. It inhabits America. Thorax is of a downy green; front vesicular green; abdomen greenish at the base, but towards the tip blackish; all the wings with a black dot in the middle at the rib, and an oblong stigma at the tip.

FLAVEOLA. Wings pale yellow at the base. Inhabits Europe. Its wings are sometimes without the yellow spot.

LINEATA. Wings white with a yellowish base, and black band and tip; abdomen yellow, with a lateral black line. This species is found in India. Its head and thorax are yellow; abdomen compressed.

STIGMATIZANS. This is a yellowish insect; has wings with a brown spot, the tip brown with a snowy stigma. It is found in New Holland. Sir Joseph Banks has a specimen in his museum. The abdomen is marked with black lines; wings hyaline.

OCULATA. Like the last, this is of a yellowish colour; the upper wings are hyaline at the tip, lower ones at the margin, with a snowy stigma. It inhabits New Holland.

INDICA. This species has wings varied with yellow and brown, and white at the tip; the lower ones have a blue spot at the base. It is found, as its name imports, in India. The body is brown; tip of the wings hyaline.

MUNCIA. Bronzed; wings are of a whitish colour spotted with brown; the lower ones yellow at the base. Inhabits India.

VESICULA. Wings white; takes its name from an elevated vesicular front, and thorax yellow immaculate. Is found in America, and is a large insect; the abdomen is cylindrical, the segments pale at the base and black at the tip; tail with cylindrical scales.

RUBICUNDA. Lower wings only blackish at the base; body square. An inhabitant of Europe. In one sex the back is spotted with red, in the other with yellow.

VULGATISSIMA. Thorax yellow, with eight black streaks. It inhabits Europe.

OBSCURA. All its wings are ferruginous; the body of a dusky hue; an American insect; the abdomen is cylindrical; wings with an oblong brown marginal dot.

VULGATA. Wings hyaline immaculate; abdomen cylindrical and reddish. Inhabits Europe.

SIBERICA. Wings hyaline, with a transverse broad ferruginous

## LIBELLULA.

ruginous band towards the tip; body reddish. Inhabits Siberia.

**SINATA.** The wings of this insect are flat, longitudinally sinuate, and black on the thicker margin, with a white stigma. The body is bluish. There is a specimen in the British Museum.

**CANOPULATA.** Wings immaculate at the base; back and fides of the abdomen interrupted by yellow. It inhabits Europe.

**PEDEMONTANUS.** Found among the mountainous parts of Italy; wings flat, cinereous, with a brown band at the tip. It is small, and the body of an obscure yellowish.

**FASCIATA.** Wings flat, brown, with a white streak. It inhabits India.

**UMBRATA.** Found in America. Wings flat, with a brown band.

**SERVA.** Wings flat, white, with an oblong black spot at the base and band in the middle. It inhabits China. The body is cylindrical.

**NOTATA.** The wings of this are flat, with white spots and tip. It inhabits Africa. A specimen is in the museum of Sir Joseph Banks.

**DIMIDIALA.** Wings flat and black from the base to the middle. It is found in America.

**EQUESTRIS.** Wings half black, with a snowy band in the middle. It inhabits Africa. A specimen in the museum of Sir Joseph Banks. The head is brown, with a yellow dorsal line; all the wings are black from the base to the middle, then a snowy band; the tip hyaline with a common brown spot.

**FLUCTUANS.** Wings black tip with white. It inhabits India, is small, and brown; the front is vesicular yellowish.

**NEBULOSA.** Wings white tip with black. It inhabits India; the body is black; mouth yellow; fides of the thorax and abdomen spotted with yellow; tail with yellow appendages.

**CHINENSIS.** The upper wings faint testaceous; lower ones green tip with brown. It inhabits China.

**VERSICOLOR.** Wings flat, white with three black and three cinereous spots. It inhabits America. A specimen is in the museum of Dr. Hunter. The head is brown, spotted with yellow; thorax brown, with two yellow lines each side under the wings; the abdomen is brown.

**VIBRANS.** Wings flat, white with a black spot in the middle, the tips ferruginous.

**AMERICANA.** Notwithstanding the name, this species is found in India. Wings purplish, with a white band; upper pair tipped with white, lower ones with a white line at the base.

**MARGINATA.** Wings black; upper pair with a white spot at the tip; lower ones edged with white. It inhabits Africa; may be seen in Sir J. Banks's museum. The front is blue; eyes brown, dotted with yellow; thorax black; abdomen brown, whitish at the base.

**FERRUGINEA.** Wings white, yellow at the base; body red. It inhabits China.

**TOMENTOSA.** The wings of the insects of this species are also white; but the body is downy variegated with brown and green. It is found in America. The front is blue; abdomen cylindrical black, the segments with a greenish dot on each side.

**ÆNEA.** Wings hyaline; thorax green bronzed. It inhabits Europe.

**CYANEA.** Wings white, with a snowy spot terminated by a brown one. The body is blue. It inhabits America.

**6-MACULATA.** Wings with three black costal spots, the last with a snowy stigma; lower ones with yellowish bands. It inhabits China. The head is yellowish; thorax yellowish with black lines; abdomen flat and yellowish with black lines.

**CONTAMINATA.** Yellowish; wings whitish, with a yellowish shade in the middle. It inhabits India. The head, thorax, and abdomen yellowish.

**EPONINA.** Wings yellowish, with about three black bands. Is found in Carolina. Head and thorax yellowish; abdomen cylindrical, with a yellowish dorsal and lateral line; all the wings have a white costal spot near the tip.

**VARIA,** or great variegated libellula, the most remarkable English species, makes its appearance towards the decline of summer, and is an animal of singular beauty; it is three inches long, and the wings, when expanded, measure about four inches from tip to tip. Wings varied with yellow and brown, the tip with a white spot terminated by a black one. The head is very large, and affixed to the thorax by an extremely slender neck; the eyes occupy by far the greatest part of the head, and are of a pearly blue-grey cast, with a varying lustre; the front is greenish-yellow; the body is long, slender, and black, with rich variegations of bright blue, and deep grass-green. The wings are perfectly transparent, strengthened by numerous black reticular fibres, and exhibit a strongly iridescent appearance, according to the different inflections of light. This insect, in its motions, is extremely rapid, flying about in pursuit of its prey during the middle of the day, and is at this time taken with extreme difficulty, darting off on the slightest alarm from the spot on which it settled, and in the space of a second or two flying to a great distance. During the early hours of the morning, and the late ones in the evening, it is easily taken; at such times it is offered to fit with its wings expanded, but in so inert a state, that it will suffer itself to be readily seized by one of its wings, without attempting to move from its place.

**JUNCEA.** Wings with a blackish accessory membrane; thorax with six yellow lines; abdomen tapering towards the base. Inhabits Europe.

**CAROLINA.** Wings whitish; lower ones indented ferruginous at the base; thorax brown. An inhabitant of America.

**CAPENSIS.** In this species the whitish wings are every where spotted and dotted with brown; it is found, as its name imports, at the Cape of Good Hope.

**TRICOLORA.** Wings variegated with brown, bluish, and yellow, the tip hyaline. An inhabitant of India.

**RUBRA.** Is so named from its reddish colour; the wings with a ferruginous base and marginal lines. It inhabits Europe.

### ♁ Divisions of the Lip equal.

**FORCIPATA.** This insect, like the *varia*, is very large, and expands full four inches and a half. Nose yellow, with a black line on the prominent part; thorax black, with several broad yellow stripes, two on the front, and two behind the ligaments of each pair of wings; abdomen black, with two streaks resembling a erecton on each segment; wings transparent and white, with a tinge of amber; tail with three incurved claws.

**GRANDIS** is the largest of this genus found in Britain, and is, perhaps, not inferior in bulk to any insect which this country produces; the fore-part of the head is yellow; the eyes brown, and so large, that they meet at the top of the head. The thorax is of a dun colour, with four oblique bands on each side of a lemon colour. The abdomen

is reddish, often spotted with white and black upon the top and bottom of each segment; the small appendices which terminate the abdomen are very long; the wings have more or less of a yellow complexion, and are distinguished by a brown spot on the exterior edges. The colours of the insect vanish when dead.

**VARIIGATA.** Thorax with two yellow lines on each side; wings with a white spot at the base. It inhabits Terra del Fuego. A specimen is in the museum of sir Joseph Banks. The body is brown; mouth yellowish, with a black dot at the base; the abdomen is round and ferruginous, the segments are edged with black, and in each a white spot divided by a black line.

**CLAVATA,** has a clavate abdomen, which is gibbous at the base, variegated with brown and green. It inhabits China. The head is vesicular green; thorax green with black lines; abdomen green with black streaks, the middle thinner and black with lateral yellow spots, the tip thickened black with a white tail.

**MINUTA.** Abdomen yellow, with two black lines; lower wings yellow with two black spots. It is an inhabitant of China. The head is yellow, eyes brown; thorax with yellow lines beneath; abdomen with two black lines above and beneath; upper wings black at the base with a yellow spot.

*B. Wings erect when at rest; eyes distinct; outer divisions of the tip bifid.*

**VIRO.** This is one of the most elegant of the European insects, but is smaller than the *varia* or *grandis*, and is distinguished by its slender, long, cylindrical body, which, as well as the head and thorax, is usually either of a bright but deep golden-green, or else of a deep gilded blue; the wings are transparent at the base and tips, but are each marked in the middle by a very large oval patch of dark violet blue, accompanied with iridescent hues, according to the direction of the light; sometimes the wings are entirely violet-black, without the least appearance of transparency either at the base or the tips, and sometimes they are altogether transparent, without any appearance of the violet-black patch which distinguished most of the individuals: lastly, the insect sometimes appears with transparent wings, but shaded with a strong cast of gilded greenish-brown, each being marked by a small white speck at the exterior edge near the tips. The genus is divided into varieties, *viz.*

*a.* Body shining green-blue; wings blueish in the middle, the base and tip whitish, the margin immaculate. Donovan. *b.* Body silky; wings blueish-green, the tip brown, the margin immaculate. Reaumur. *c.* Body silky-green; wings brownish with a white marginal dot. *d.* Body silky; wings brown-gilt with a black spot. It inhabits Europe, and is common about waters.

**PUELLA.** Wings hyaline, not coloured. This is a much smaller species than the *virgo*. It varies in colour, but is generally of a bright and beautiful sky-blue, variegated with black bars on the joints, and with the thorax marked by longitudinal stripes; the wings are transparent, and each marked near the tip with a small, oblong, square, black, marginal spot: the head in this species is broader and narrower in proportion than that of the *L. varia*, and the eyes are round, protuberant, and placed on each side at a distance from one another. From the brilliancy and richness of its colours, it has been called the king's-fisher; it frequents little rivulets of water overhaded with bushes. There are several varieties of this species, taken from the difference of spots and colours: as *a.* Body red with yellow and black lines at each segment; thorax green with yellow lines; wings with marginal spots. This is given by Mr. Donovan.

*b.* Body flesh colour; wings with a brown marginal dot. *c.* Body alternately blue and cinereous; wings with a black dot. *d.* Body beneath blue-green, above brown; thorax with alternate brown and blueish bands; wings with a black marginal dot. *e.* Body green with a flesh-colour bluish; thorax with three black lines; wings with a brown marginal dot. It inhabits Europe, in almost endless varieties.

**CILIATA.** Green-bronzed; abdomen brown; legs fringed black. Inhabits Coromandel. A specimen is in sir Joseph Banks's museum. Head and thorax bronzed; abdomen cylindrical.

**NOBILITATA.** Upper wings dusky; lower ones silky green tipped with black. Is found in South America. Body glossy green; lower wings beneath black.

**LINEARIS.** Wings with a yellowish or black stigma; abdomen extremely strong. Is found in India, and is figured by Drury; who, according to Dr. Shaw, has given a beautiful figure of a species not mentioned by Gmelin, *viz.* the

**LUCRETIA,** which is a native of the Cape of Good Hope, and is distinguished by the length of its slender body, which is about five and a half inches long, though scarcely the tenth of an inch in diameter. The wings of this species are transparent, slender, and narrow; they measure from tip to tip five and a half inches. The colour of the head and thorax is brown, with a yellowish stripe on each side, and the body is of a deep mazarine blue.

Having described the several species of the libellula, we shall close our account of this interesting genus of insects with some account of the eyes, as described in Adams' Essays. These are finely adapted for microscopical examination; and by the assistance of a good instrument, it will be seen that the eye is divided into a number of hexagonal cells, each of which forms a complete eye. The external parts of these eyes are so perfectly smooth, and so well polished, that when viewed as opaque objects they will, like so many mirrors, reflect the images of all surrounding objects. The figure of a candle may be seen on their surface multiplied almost indefinitely, shifting its beam to each eye according to the motion given to it by the hands of the observer. Læwenhoeck says, there are twelve thousand five hundred and forty-four lenses on each eye of the libellula. If one of the protuberant substances be nicely taken from the head of the insect, washed clean, and placed before the microscope, its structure is elegantly seen, and it becomes an object worthy of the highest admiration. Each of the eyes is a hexagon, and has the same effect as a convex lens in forming the image of an object placed before it, as may be seen by turning the mirror of the microscope so as to bring the picture of some well-defined object under the eye. If turned to a single house, in the eye of the insect the house is diminished very much, but it is multiplied into a city; if turned to a soldier, there will be seen an army of pigmies performing every motion at the same instant of time; if turned towards a candle, there will be a beautiful and resplendent blaze from multitudes of regular flames. See Adams' Essays, 4to. p. 195-6.

**LIBEN,** in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 11 miles N. of Leitmeritz.

**LIBER,** in *Vegetable Anatomy*, an ancient Latin word for the thin inner bark or rind of a tree, which being used to write upon before the invention of parchment or paper, is supposed to have given its name to a book. For the nature and functions of the *liber*, see BANK and CORTEX.

**LIBER Niger,** *domus Regis*, is the title of a book in which there is an account of the household establishment of king Edward IV., and of the several musicians retained in his

service, as well for his private amusement, as for the service of his chapel. See KING'S BAND, HOUSEHOLD, and CHAFEL *Establishment*. See also, N 203 of the Harl. MSS. Brit. Mus. and N° 1147, 2, 3, 11, of the Ashmol. Collect. Oxf. for "ordinances touching the king's household," made in the time of Edward II. as well as in that of Edward IV. And in the Liber Niger published by Batman, with additions.

LIBERA, in *Mythology*, the name of a goddess, which Cicero, in his book of the Gods, represents as the daughter of Jupiter and Ceres. Ovid in his *Fasts* says, that the name was given by Bacchus to Ariadne.

LIBERA is exhibited on medals, as a kind of female Bacchus, crowned with vine-leaves.

LIBERA, in *Law*, a livery or delivery of so much corn or grafs to a customary tenant who cut down or prepared the said grafs or corn, and received some part or small portion of it as a reward or gratuity. Cowell.

LIBERA *Chafsa habenda*, a judicial writ granted to a person for a free chafe belonging to his manor, after proof made by inquiry of a jury, that the same of right belongs to him. Reg. Orig. 36.

LIBERA *Piscaria*, a free fishery, which being granted to a person, gives him a property in the fish, &c. (2 Salk. 637.) See FISHERY.

LIBERAL ARTS, are such as depend more on the labour of the mind than on that of the hand; or, that consist more in speculation than operation; and have a greater regard to amusement and curiosity than to necessity.

The word comes from the Latin *liberatus*; which, among the Romans, signified a person who was not a slave; and whose will, of consequence, was not checked by the command of any master. See ARTS.

LIBERALE VERONESE, in *Biography*. By this name Vafari speaks of an historical painter, born at Verona in 1451. He was at first a disciple of Vincenzo di Stefano; but afterwards he imitated the style and manner of Bellini of Venice, whom, while a youth, he saw painting in the chapel of St. Nicolo at Verona.

He began to paint very early in life, and filled the churches and convents of his native city with highly wrought pictures, which were very much esteemed; and of which the author above-mentioned speaks with high encomiums.

His style appears by his account to be of the early dry manner in art. Compositions consisting of a number of figures, all finished with great minuteness; and frequently of small proportions.

LIBERALIA, feasts celebrated by the ancient Romans, in honour of Liber, or Bacchus, the same with those which the Greeks called *Dionysia*, and *Dionysiacs*.

They took their name from *liber*, i. e. *free*, a title conferred on Bacchus, in memory of the liberty or freedom which he granted to the people of Bœotia; or, perhaps, because wine, whereof he was the reputed deity, delivers men from care, and sets their minds at ease and freedom. Varro derives the name of this feast from *liber*, considered as a noun adjective, and signifying *free*; because the priests were free from their function, and eased of all care, during the time of the liberalia, as the old women officiated in the ceremonies and sacrifices of these feasts.

LIBERAM LEGEM. See LEX.

LIBERAN, in *Geography*, a small island of the East Indian sea, near the N.E. coast of the island of Bornoe, on which are many deer. N. lat. 6° 2'. E. long. 116° 8'.

LIBERANDIS TERRIS. See TERRIS.

LIBERATE, in *Law*, a writ that lies for the payment of a yearly pension, or sum of money, granted under the

great seal, and directed to the treasurer, chamberlains, and barons of the exchequer, &c. for that purpose.

In another sense it is writ to the sheriff of a county, for the delivery of possession of lands, and goods extended, or taken upon the forfeiture of a recuzance.

Liberate is also used for a writ issuing out of the chancery, directed to a gaoler for delivery of a prisoner, who hath put in bail for his appearance. F. N. B. 132 6 Inst. 116.

LIBERATI, ANTIMO, in *Biography*, a singer in the pontifical chapel at Rome in the 17th century. When a youth, he was a choirster in the chapel of the emperor Ferdinand III., and his brother Leopold, previous to his admission into the pope's chapel: where, besides his vocal abilities, he distinguished himself as a composer. He was, likewise, organist della santissima Trinità di Pellegrini, and maestro di cappella, and organist of the church di Santa Maria dell' anima della nazione Teutonica at Rome. In this quality he wrote a letter, which is often quoted, particularly by Adami, in his *Osservazioni per ben reg. il cocomo de i Cantoci della Cap. Pont.* This letter is addressed to Ovidio Persapegi, in answer to some queries he had sent to him, concerning the state of music in the pontifical chapel; and the character of some musicians in its service, who were candidates for the place of maestro di cappella of the Metropolitan church at Milan.

This letter, printed at Rome 1685, contains characters of the great Roman maisters, and descriptions of styles, more resembling sound criticism than any musical work of the last century; but it is, unluckily, written in such a vein of general panegyric, as is more likely to generate scepticism in the minds of modern readers, than conviction. Liberati was a disciple of Benevoli, and his voice a soprano.

LIBERATUS, a deacon of the church of Carthage, flourished about the middle of the sixth century. In the year 534, he was sent to Rome by a council of African bishops held at Carthage for the purpose of consulting with pope John about some dubious points; and he was frequently employed respecting affairs of importance. He drew up an historical memorial of the contents which arose about the opinions of Nestorius and Eutyches, entitled "Breviarium de Causa Nestorii et Eutychetis, &c." The materials made use of on this occasion were collected from the relations of various credible persons, the history of the church, translated out of Greek into Latin, authentic acts of councils, and the letters of different bishops. An appendix to this Breviarium is given by father Crabe, in the second volume of his edition of the Councils. Moreti.

LIBERGA, in *Geography*, a town of Prussia, in the palatinate of Culm: 26 miles E. of Culm.

LIBERHOF, a town of Prussia, in the province of Pomerania; 18 miles S.S.E. of Dantzic.

LIBERI *Tauri Libertas*. See TAURI.

LIBERIA, a feast held among the Romans, on the day whereon their children laid aside their juvenile habits, and assumed the robe called *toga liberia*.

The liberia were kept on the 16th of the kalends of April; that is, on the 17th of March.

LIBERIUS, pope, in *Biography*, a native of Rome, who, having discharged the duties of different ecclesiastical offices with reputation, was chosen bishop in 352. Immediately after his election he wrote to Athanasius, summoning him to appear at Rome, and clear himself from the accusations preferred against him by the eastern bishops. It should seem he had afterwards a much better opinion of Athanasius, and undertook his defence with great zeal. With this view he sent legates to a council which the emperor Constantine had summoned to meet at Arles, but had

the mortification to hear they had betrayed the cause entrusted to them. When Liberius was told of the conduct of his deputies, he was filled with resentment and sorrow, and disavowed it in the strongest terms, as well in his declarations, as in his correspondence. He requested the emperor to assemble a new council, for the purpose of examining the matters in dispute between Athanasius and his opponents, and of restoring peace and tranquillity to the Catholic church. A council was accordingly held at Milan in 355, at which there were 300 western bishops, and a few from the east. So far from calm discussion into the merits of the question, the emperor insisted upon it, as a preliminary measure, that they should give their signatures to the condemnation of Athanasius, and also to an edict containing the chief tenets of Arius, which had been published in his name. Those who had resolution to oppose the will of the emperor were threatened with instant execution, and were actually banished. Such were the means used by Constantius in obtaining the signatures of the by far the greater part of the western bishops to the condemnation of Athanasius; but Liberius still declared in his favour, and exerted himself, by all the means in his power, to gain others to his party. At length, the emperor having failed, by threats and proffered bribes, to gain the suffrages of the pope, he determined to apprehend him, and gave his order accordingly. This was executed in the dead of night, to prevent any commotion among the people, who were much attached to their bishop; he was carried first to Milan, and thence to Berræa in Thrace. The hardships which Liberius experienced in exile, disposed him to yield to conditions which at one time he would have rejected with the utmost indignation. He not only subscribed to the condemnation of Athanasius, but received, as Catholic, the Arian confession, and made other concessions still more disgraceful to his reputation as bishop of the holy Roman see. Before he could reach Rome, the emperor had embraced the doctrine of the Semi-Arians, and obliged Liberius to do the same; so that this pontiff, who, of course, was always the infallible head of the church, avowed himself an Athanasian, an Arian, and a Semi-Arian. On account of his obedience, he was permitted to return to Rome, on condition that he should govern the church jointly with FELIX II. (See the article.) Liberius arrived at Rome in August, 358, and entered the city in a kind of triumph, being met on the road, and received by the people at large with loud acclamations of joy. He died in September, 366, after he had presided over the Roman see fourteen years; and notwithstanding his repeated change of religious opinions, he is honoured both by the Latin and Greek churches as a saint. "A Dialogue with the Emperor Constantius" is ascribed to Liberius; so, likewise, are twelve "Letters," inserted in the second volume of the *Collect. Concil.* Bower. Moreri.

**LIBERO**, *Ital.*, free, unconfined, in *Musick*, the same as *fiolito*; opposed to *Legato*, restrained by particular laws. Thus, a *free fugue*, is distinguished from a canon; *fuga fiolita*, or *Libera*, from *Fuga perpetua*. See *CIOLTA*, and *LEGATO*.

**LIBERTAS ECCLESIASTICA**, *Church Liberty*, a frequent phrase in old writers, who treat of ecclesiastical immunities. The right of investiture, extorted from our kings by the papal power, was at first the only thing challenged by the clergy, as their *libertas ecclesiastica*, but by degrees under the title of *church liberty*, they contended for a freedom of their persons and possessions, from all secular power and jurisdiction; as appears by the canons and decrees of the councils held by Boniface, archbishop of Canterbury, at Merton, A. D. 1258, and at London, A. D. 1260, &c.

See Lord Littleton's *Hill.* of Hen. II., and Robertson's *Hill.* of Ch. V.

**LIBERTATE PROBANDA**, in *Law*, an ancient writ that lay for such as being demanded for villains, offered to prove themselves free; directed to the sheriff, that he should take security of them for the proving of their freedom before the justices of assize, and that in the mean time they should be unmolested. F. N. B. 77.

**LIBERTATIBUS ALLOCANDIS**, a writ lying for a citizen or burgher, impleaded contrary to his liberty, to have his privilege allowed. Reg. Orig. 262.

If any claim a special liberty to be impleaded within a city or borough, and not elsewhere, there may be a special writ *de libertatibus allocandis*, to permit the burghesses to use their liberties, &c. These writs are of several forms, and may be sued by a corporation, or by any single person, as the case shall happen. (New Nat. Br. 509, 510.) The barons of the Cinque Ports, &c. may sue forth such writs, if they are delayed in having their liberties allowed them.

**LIBERTATIBUS Exigendis in Iinere**, an ancient writ by which the king commands the justices in eyre to admit of an attorney for the defence of another man's liberty. Reg. Orig. 19.

**LIBERTATIS Angliæ Custodes**. See *CUSTODES*.

**LIBERTE' de la Musique**, is the title of one of the late M. D'Alembert's Essays in his "Melange de Litterature," published in 1767. After being the champion of Rameau's system, and his *basse fondamentale*, he became his opponent, and a convert to Italian music. He enters into all the reasoning of Rousseau against the French style of composition, but in a more guarded manner. Indeed, he appears never to have heard good Italian music well performed. The *Suva Paderna* of Pergolesi, executed by a troop of Italian burlesque singers, not of the first class, was his standard of perfection. He tries hard to persuade the French that their music is bad, without knowing very well in what the Italian was superior. Rousseau had resided at Venice a considerable time, and seems forcibly to have felt all the lyric beauties of Metastasio's poetry, as well as the merit of the great composers and enchanting powers of the great singers of his time. This, D'Alembert only knows by tradition. It was easy for a man of his abilities to ridicule the old French music, and praise the Italian; but he was too little acquainted with its real beauties to know why Italian dramatic vocal music was superior to all other music, and the French inferior. But it may, perhaps, be roundly asserted that the French vocal music *was, is, and probably ever will be* inferior to the Italian from bad singing, as well as from the nasal nature of their language, and the national expression founded upon it, by which the vocal organ is vitiated from infancy to age, and its tones in their expression rendered unpleasing to all ears but those of the natives.

The French, since the time of Rameau, have often had fine compositions performed in their theatres, and a well disciplined band to execute them *instrumentally*; yet, for want of good singers, the vocal part, which is the best and most interesting in an Italian opera, is the worst in the musical dramas of France. And for this there are two causes which affect the composition as well as the performance of French opera songs: the composer, be he a Gluck, a Piccini, or a Sacchini, having no great vocal talents to display, dares not give way to fancy, or aim at new passages, but, of necessity, *underwrites* the vocal part so much, that the productions of these great masters for the French stage are never in favour elsewhere with their greatest admirers. And even the simple

Simple and common passages given to the voice, are so ill sung, that they give pleasure to no ears but those which are accustomed to nothing better.

In 1707, when D'Alembert wrote in favour of *toleration* in the musical religion of France, the accompaniments to what were called songs at the opera were so busy and so loud, that he compares the effect to twenty people reading different books at the same time.

Though D'Alembert and Rousseau quarrelled about the expediency of allowing plays to be acted within the walls of Geneva; yet the mathematician in his discourse on the Liberty of Music, is but a commentator on the citizen of Geneva's "Letter concerning French Music."

On the subject of adapting Italian melody to French words, the great geometrician has not taken into his calculation all the objections to its success. In Italian poetry each verse is terminated by a double rhyme; and in the French poetry, the masculine and feminine rhymes are alternate. This must affect the melody. The mute syllables in French poetry (which are dogrel in English), can alone receive Italian melody: the masculine rhymes admit of no imitation.

M. D'Alembert, however, modestly says, that all his reflections are not worth, a single fine air in music; and adds (after Rousseau), that "inventing what succeeds is infinitely preferable to philosophical reasoning: a composer never thinks of giving precepts who is able to furnish models: Raphael produced pictures, not dissertations. In music, we (the French) write reveries; and the Italians compose and execute music." The two nations, in this respect, resemble the two architects who were candidates at Athens for the erection of a monument which the republic wished to raise to a deceased hero; one of them spoke a long while with great eloquence on his art; the other, after listening with great attention, only uttered these words: "What he says, I have done."

**LIBERTINES.** See **FRANCHISE.**

**LIBERTINES**, in *Scripture History*, the denomination of a class of Jews, or Jewish proselytes, who had a synagogue at Jerusalem, which is mentioned in the book of Acts, ch. vi. 9. Libertinus, or Libertine, denoted a person who had been a slave, but who had obtained his freedom; or one who was the son of a person that had been a slave, and was afterwards made free. Several learned men have supposed, that the libertines above-mentioned were Jews, or proselytes of the Jewish religion, who had been slaves to Roman masters, and had been made free, or the children of such. In proof of this, the learned Lardner alleges, that there was a great number of Jews at Rome; and, according to Philo, they occupied a large quarter of the city; and they were chiefly such as had been taken captive at several times, and had been carried into Italy, and were made free by their Roman masters. That these Jews were called Libertines, appears plainly from passages, which Lardner has cited from Tacitus, Josephus, and Suetonius, in which they speak of the banishment of the Jews from Rome in the reign of Tiberius. Josephus and Suetonius expressly call those Jews, whom Tacitus calls men of the Libertine race; and as there were many of them at Rome, it is not at all unlikely that they had a synagogue at Jerusalem. Such are the sentiments of Grotius and Vitringa, adopted by Lardner's Works, vol. i. p. 114.

**LIBERTINES**, *Libertini*, in *Eccl. scissal History*, a religious sect, which arose in the year 1525, whose principal tenets were, that the Deity was the sole operating cause in the mind of man, and the immediate author of all human actions: that,

consequently, the distinctions of good and evil, which had been established with regard to those actions, were false and groundless, and that men could not, properly speaking, commit sin; that religion consisted in the union of the spirit, or rational soul, with the Supreme Being; that all those who had attained this happy union, by sublime contemplation and elevation of mind, were then allowed to indulge, without exception or restraint, their appetites or passions; that all their actions and pursuits were then perfectly innocent; and that, after the death of the body, they were to be united to the Deity.

They likewise said that Jesus Christ was nothing but a mere *je ne sçai quoi*, composed of the spirit of God, and of the opinion of men.

Their maxims occasioned their being called Libertines: and the word has been used in an ill sense ever since.

The Libertini spread principally in Holland and Brabant. Their leaders were one Quintin, a Picard, Poekelius, Ruffus, and another called Chopin, who joined with Quintin, and became his disciple.

This sect obtained a certain footing in France through the favour and protection of Margaret, queen of Navarre, and sister of Francis I., and found patrons in several of the reformed churches. This sect was probably a remnant of the more ancient *Beghards*, or *Brethren of the Free Spirit*. Mosheim's *Eccl. Hist.* vol. iv.

**LIBERTINES of Geneva**, were a cabal of rakes rather than of fanatics: for they made no pretences to any religious system, but pleaded only for the liberty of leading voluptuous and immoral lives. This cabal was composed of a certain number of licentious citizens, who could not bear the severe discipline of Calvin, who punished with rigour not only dissolute manners, but also whatever bore the aspect of irreligion and impiety. In this turbulent cabal there were several persons who were not only notorious for their dissolute and scandalous manner of living, but also for their atheistical impiety and contempt of all religion. To this odious class belonged one Gruet, who denied the divinity of the Christian religion, the immortality of the soul, the difference between moral good and evil, and rejected with disdain the doctrines that are held most sacred among Christians; for which impieties he was at last brought before the civil tribunal, in the year 1550, and condemned to death. The Genevan spirit of reformation, improperly directed by the violence and zeal of Calvin, did at this time operate to a degree, which has marked the character of this great reformer with reproach. For, in 1544, Sebastian Castalia, master of the public school at Geneva, who was a man of probity, and distinguished by his learning and taste, was, nevertheless, deposed from his office and banished the city, because he disapproved some of the measures that were pursued, and some of the opinions entertained by Calvin and his colleagues, and particularly that of absolute and unconditional predestination. Jerome Bolsee, also, a man of genius and learning, who became a convert to the Protestant religion, and fled to Geneva for protection, was cast into prison, and, soon after, sent into banishment, because, in 1551, he imprudently and indecently declaimed, in full congregation, and at the close of public worship, against the doctrine of absolute decrees. Mosheim's *Eccl. Hist.* vol. iv.

**LIBERTUS**, or **LIBERTINUS**, among the Romans, a freedman, or a person set free from a legal servitude.

These still retained some mark of their ancient state; he who made a slave free having a right of patronage over the libertus; so that if the latter failed of shewing due respect to his patron, he was restored to his servitude; and if the liber-

tus died without children, his patron was his heir. See SLAVE.

In the beginning of the republic, *libertinus* denoted the son of a *libertus*, or freed-man; but afterwards, before the time of Cicero, and under the emperors, the terms *libertas* and *libertinus*, as Suetonius has remarked, were used as synonymous.

**LIBERTY**, in *Geography*, a post-town of America, in Virginia; 15 miles from New London. This is the chief town of Bedford county; it has a handsome court-house, and contains 50 or 60 houses.—Also, a county of Georgia, bounded N. by Brian, S. by Mackintosh, W. by Alamaha, and N. E. by the ocean. It is 40 miles long, and 22 broad. The productions are cotton and rice. An acre of land yields 25 or 30 bushels of corn. It derives its name from the circumstance, that its inhabitants were the first in the state who declared for liberty, and sent a delegate to the congress at Philadelphia. It is divided into five towns, and contains 5313 inhabitants, of whom 3940 are slaves.—Also, a post-town of Maryland, in Frederick county; 12 miles N. E. of Fredericktown, and about 44 miles N. N. W. of the Federal city.

**LIBERTY**, *Libertas*, is usually understood of that state wherein a man acts freely; or that power by which he determines himself voluntarily either to good or evil, to this thing or that.

This is what some have denominated a liberty of *indifference*, *natural* liberty, *philosophical* liberty, or liberty of choice; defining it to be a power of doing an action or its contrary, all the previous circumstances remaining the same. In this sense it stands opposed to *necessity*, and is distinguished from *external* liberty, or liberty of *action*, which is defined to be the power of doing what we please or will; or, in other words, the power of carrying our volitions or purposes into effect. This *external* liberty is opposed to *compulsion* from external force, as *philosophical* liberty is to *necessity*, or the definite influence of motives, in definite circumstances. Accordingly it is said, that liberty of *action* may exist independently of liberty of *choice*; that is, the mind may be wholly untrammelled in the execution of its volitions, though in the same circumstances it could not have made a different choice. Liberty of *choice* likewise, if it exists at all, is perfectly independent of liberty of *action*.

Most of the schoolmen confound liberty and the will together, and make one definition serve for both. Whereas Mr. Locke observes, that liberty does not belong to the will, but to the man or agent; and therefore, that the question, in the usual manner of stating it, whether man's will be free or not, is absurd and unintelligible. Liberty, which is but a power, belongs only to agents, and cannot be an attribute or modification of the will, which is also but a power. They distinguish liberty into a great many kinds; as liberty of *contrariety*, and liberty of *contradiction*. (See FREEDOM.) Also, *next* liberty, *proxima*, which is a full absolute freedom of doing any thing: *remote* liberty, which is a liberty that comprehends a natural power, though embarrassed with obstacles, which it is in our power to remove, and to attain to a next liberty. Some writers have divided liberty into

**LIBERTY**, *Physical*, or *Philosophical*, or liberty of *choice*, which is that principle of spontaneity or self-determination, that constitutes us agents; or that gives us a command over our actions, rendering them properly our's and not effects of the operation of any foreign cause. Without this liberty, or being under a necessity of always following some will different from his own, man would be a machine acted upon by mechanical springs, having no principle of motion in himself

or command over events: and, therefore, incapable of all merit and demerit.

Whether man is endued with this kind of liberty or self-determining power has been a subject of much controversy: it was agitated at the beginning of the last century, between Leibnitz, Collins, &c. on one side, and Clarke, Jackson, &c. on the other; and has been more lately revived by Dr. Priestley.

Cicero defines liberty the power of living after a man's own wish, without any cause or impediment to oblige him to do one thing rather than another.

F. Malebranche gives us a still more philosophical definition: the will he defines to be that impression, or natural motion, which inclines towards good in the general; and by liberty, he understands, that power which the mind has of determining this general impression towards such objects as please us; and so of directing our general inclinations to some particular things.

When it is easy to perceive, that though all natural inclinations be voluntary, yet they are not all free; not, we mean, with a liberty of indifference, which includes a power of willing, or not willing, or of willing quite the contrary to that which our natural inclinations lead us to. For though it is voluntarily and freely that we love good in general, it is absurd to suppose we should love any thing without the will, or that the will can ever be constrained; yet we do not love it freely (in the sense just laid down) because it is not in the power of the will not to desire to be happy.

It must be observed, however, that the mind, considered as determined towards good in general, cannot divert its motion to any particular good, unless the same mind, considered as capable of ideas, have some knowledge of that particular good: that is, in plainer terms, the will is a blind power, that cannot direct itself to any thing but what the understanding represents to it; so that the power which the will has to determine its impression towards general good, or its natural inclinations, variously, consists in the power it has to command the understanding to represent some particular good.

Thus, a person, for instance, represents some dignity to himself, as a good to be wished for, immediately the will desires this good; that is, the impression which the mind continually receives towards good in general, determines it to this dignity. But as that dignity is not the universal good, nor is perceived clearly and distinctly as such by the mind (for the mind cannot conceive a thing clearly which is not), the impression we have towards good in general, is not entirely exhausted by that particular good; the mind has an inclination to go farther; it does not love that dignity necessarily or invincibly, and in this respect is free.

Now its liberty consists in this, that, not being fully convinced that this good contains in it all the good it is capable of enjoying, it may suspend its judgment and its desire.

The case is nearly the same with regard to the knowledge of truth: we love this, as we do the enjoyment of good, by a natural impression; which impression is not invincible in the latter, excepting evidence be full, and our knowledge of the object complete. We have the same liberty in our false judgments, that we have in our irregular appetites. See JUDGMENT and WILL.

Mr. Locke defines liberty to be the power which a man has to do or forbear doing any particular action, according as its doing or forbearance has the actual preference in the mind, which is the same thing as to say, according as he himself wills it: and he observes, that so far as a man has power to think or not to think, to move or not to move, according

## LIBERTY.

ording to the preference or direction of his own mind, so far as a man free. The will, he acknowledges, is always determined by some, and for the most part, by the most pressing uneasiness or desire of happiness. The liberty for which he contends, and for the existence of which he appeals to experience, is a liberty of suspending our determination. The mind, he says, having in most cases, as is evident in experience, power to suspend the execution and satisfaction of any of its desires, and so all, one after another, is at liberty to consider the objects of them, examine them on all sides, and weigh them with others. In this lies the liberty a man has. He has a power to suspend the prosecution of this or that desire, as every one daily may experience in himself. This seems to be the source of all liberty. In this seems to consist, as he thinks, that which is improperly called free-will. And he adds farther, that perfect indifference in the mind, not determinable by its last judgment of the good or evil, that is thought to attend its choice, would be so far from being an advantage and excellency of an intellectual nature, that it would be as great an imperfection as the want of indifference to act or not to act; till determined by the will, would be an imperfection on the other side. *Ess. vol. i. chap. 21.*

From these concessions the advocates for necessity have pleaded the authority of Mr. Locke, though he does not seem to have been apprized of the consequences of his principles. Mr. Hobbes, who seems to have been the first who understood and maintained the proper doctrine of philosophical necessity, defines liberty to be the absence of all impediments to action, that are not contained in the nature and intrinsic quality of the agent. And Mr. Collins, the principal writer on the side of necessity, defines liberty to be a power in man to do as he wills, or pleases; though he denies, that we are at liberty to will, or not to will; or to will one or the other of two or more objects, between which, all things considered, we perceive a difference; or that we are free in our choice among things different or alike.

Dr. Clarke has remarked, that, in the above definition, there is an ambiguity in the words, "wills or pleases;" because they may either denote the last perception or judgment of the understanding, which is entirely passive; or the first exertion of the self-moving power, which is essentially active. Now, though the self-moving power is an adequate cause of action, yet understanding, or judgment, or assent, or approbation, or liking, or whatever name it is called by, can no more possibly be the efficient cause of action, than rest can be the cause of motion. Nothing can possibly be the cause of an effect more considerable than itself. Nothing that is passive can possibly be the cause of any thing that is active: an occasion indeed, it may be; and action may be consequent upon perception or judgment; it may easily be supposed to be always consequent upon it, and yet at the same time there may be no manner of physical or necessary connection between them. Besides, the word "do," in this definition of Mr. Collins, has no signification. For his meaning is not, that the man "acts" or "does" any thing; but the liberty or power in man to do as he wills or pleases, is with him exactly and only the same as the liberty or power in a balance would be to move as it wills or pleases; supposing the balance endued with such sensation or intelligence, as enabled it to perceive which way the weights turned it, and to approve the motion, so as to fancy that it moved itself, when indeed it was only moved by the weights. Mr. Collins makes the difference between a man and a clock, to consist only in sensation and intelligence, not in any power of acting: whereas the whole essence of liberty consists in the

power of acting: so that action and liberty are identical terms.

The liberty of a moral agent, according to Dr. Reid, is a power over the determinations of his own will. If, in any action, he had power to will what he did, or not to will it, in that action he is free. But if, in every voluntary action, the determination of his will be the necessary consequence of something involuntary in the state of his mind, or of something in his external circumstances, he is not free; he has not the liberty of a moral agent, but is subject to necessity. This liberty supposes the agent to have understanding and will; for the determinations of the will are the sole object about which this power is employed; and there can be no will without such a degree of understanding at least, as gives the conception of that which we will. The liberty of a moral agent implies, not only a conception of what he wills, but some degree of practical judgment or reason. For if he has not the judgment to discern one determination to be preferable to another, either in itself or for some purpose which he intends, what can be the use of a power to determine? His determinations must be made perfectly in the dark, without reason, motive, or end. They can neither be right nor wrong, wise nor foolish. Whatever the consequences may be, they cannot be imputed to the agent, who had not the capacity of foreseeing them, or of perceiving any reason for acting otherwise than he did. The author now cited restricts his attention to the liberty of moral agents, who are capable of acting well or ill, wisely or foolishly; and this liberty he calls, by way of distinction, "moral liberty." By necessity he understands the want of this moral liberty. This moral liberty a man may have, though it do not extend to all his actions, or even to all his voluntary actions. He does many things by instinct, many things by the force of habit, without any thought at all, and consequently without will. But in general this power over the determinations of his own will extends to every action for which he is accountable. This power may be impaired or lost, by disorder of body or mind, as in melancholy, or in madness; it may be impaired or lost by vicious habits; and, in particular cases, it may be restrained by divine interposition. In fact, man is a free agent in the same way as he is a reasonable agent. His reason is liable to be impaired or lost by his own fault, or by other means. It is also the case with respect to his freedom of action. The liberty above stated and explained has been represented by some philosophers as inconceivable, and as involving an absurdity. "Liberty," say Hobbes and others who have adopted his reasoning, "consists only in a power to act as we will; and it is impossible to conceive in any being a greater liberty than this. Hence it follows, that liberty does not extend to the determinations of the will, but only to the actions consequent to its determination, and depending upon the will. To say we have power to will such an action, is to say, that we may will it, if we will. This supposes the will to be determined by a prior will; and for the same reason, that will must be determined by a will prior to it, and so on in an infinite series of wills, which is absurd. To act freely, therefore, can mean nothing more than to act voluntarily; and this is all the liberty that can be conceived in man or in any being." The advocates of necessity maintain, that this is the only liberty that is possible, that is conceivable, and that does not involve an absurdity. Dr. Reid, however, mentions three other kinds of liberty, to which the term is very commonly applied: such are liberty, as opposed to external force or confinement of the body; liberty as opposed to obligation by law, or

## LIBERTY.

by lawful authority; and liberty as opposed to necessity, in which latter sense it extends to the determinations of the will only, and not to what is consequent to the will. It has been a question among philosophers, whether, in every instance, the determination of the will, which is the first part of the action in every voluntary action, and upon which alone the moral estimation of it depends, be the necessary consequence of the constitution of the person, and the circumstances in which he is placed; or whether he has not power, in many cases, to determine this way or that? This has, by some, been called the "philosophical" notion of liberty and necessity; but it is by no means peculiar to philosophers. The lowest of the vulgar have, in all ages, had recourse to this necessity for exculpating themselves or their friends when they do wrong, though, in the general tenour of their conduct, they act upon the contrary principle. Whether the notion of moral liberty, above stated, be conceivable or not, every man must judge for himself. "To me," says Dr. Reid, "there appears no difficulty in conceiving it. I consider the determination of the will as an effect. This effect must have a cause which had power to produce it; and the cause must be either the person himself, whose will it is, or some other being. The first is as easily conceived as the last. If the person was the cause of that determination of his own will, he was free in that action, and it is justly imputed to him, whether it be good or bad. But if another being was the cause of that determination, either by producing it immediately, or by means and instruments under his direction, then the determination is the act and deed of that being, and is solely imputable to him." Should it be said, that nothing is in our power but what depends upon the will; and therefore the will itself cannot be in our power; it may be replied, that this is a fallacy arising from taking a common saying in a sense which it was never intended to convey, and in a sense contrary to what it necessarily implies. To say that what depends upon the will is in a man's power, but the will is not in his power, is to say that the end is in his power, but the means necessary to that end are not in his power, which is a contradiction.

The principal arguments in favour of liberty, as it is popularly understood, and as it is defined in the beginning of this article, are the following: this principle is necessary to constitute man an *agent* (see *AGENT*); for, as far as it is true of a being that he acts, so far he must himself be the cause of the action, and, therefore, not necessarily determined to act: but if he has no absolute power over his own actions, *i. e.* if he be not a free agent, the actions which he performs cannot properly be said to be his own, but must be ascribed to some other power, by which he is led on to perform them; as a good clock or watch performs the motions assigned to it by the artist. This argument is excellently illustrated by Dr. Clarke: man, says he, either has within himself a principle of action properly speaking, *i. e.* a self-moving faculty, a principle or power of beginning motion; or he has not. If he has within himself such a principle, then he is a free, and not a necessary agent: for every necessary agent is moved necessarily by something else; and then that which moves it, not the thing itself which is moved, is the true and only cause of the action. That any other thing operating upon an agent, should efficiently and necessarily produce self-motion in that agent, is a direct contradiction in terms. If man has not within himself a principle or power of self-motion, then every motion and action of man is chiefly and properly produced by the efficiency of some extrinsic cause; which cause must be either what we usually call the motive or reason upon which a man

acts; or else it must be some insensible subtle matter, or some other being or substance making an impression upon him. If the reasons or motives upon which a man acts be the immediate and efficient cause of the action, then either abstract notions, such as all reasons and motives are, have a real subsistence, that is, are themselves substances; or else that which has itself no real subsistence can put a body into motion; either of which is manifestly absurd. If insensible subtle matter, or any other being or substance, continually making impression upon a man, be the immediate and efficient cause of his acting; then the motion of that subtle matter or substance must be caused by some other substance, and the motion of that by some other, till at last we arrive at a free agent; and then liberty is a possible thing, and man possibly may have liberty: and if he may possibly have it, then experience will prove that he probably, nay, that he certainly, has it. If we never arrive at any free cause, then there is either *in infinitum* a progression of motions without any mover, of effects without any cause, of things acting without any agent; which is a manifest contradiction: or else motion exists necessarily of itself. If motion exists necessarily of itself, it must be either with a determination every way, or one certain way; if with a determination every way, this is no motion at all; if with a determination one certain way, then that determination is either necessary, and consequently all other determinations impossible, which is contrary to experience; or else there must be a particular reason of that determination, and so backwards *in infinitum*, which comes to the forementioned absurdity, of effects existing without any cause.

Farther, liberty is the dictate of our own consciousness: we have, really, the same constant and necessary consciousness of liberty that we have, that we think, choose, will, or even exist; and whatever men may say to the contrary, it is impossible for them, in earnest, to think they have no active self-moving powers, and are not the causes of their own volitions, or not to ascribe to themselves what they must be conscious they think and do. Mr. Hume, though he denies the reality of liberty, grants that we have a feeling of it; that the divine plan required that we should be so made, as to seem to ourselves free; that the whole constitution of things is as if we were free; and that being under a necessity of approving and disapproving actions and characters, we are so far under a necessity of believing ourselves and others free. After these concessions, it can hardly be imagined that the constitution of nature should be altogether imposition and deceit.

"We have by our constitution," says Dr. Reid, "a natural conviction or belief that we act freely; a conviction so early and so universal, that it must be the result of our constitution, and the work of him that made us." And he adds, "the genuine dictate of our natural faculties is the voice of God no less than what he reveals from heaven; and to say that it is fallacious, is to impute a lie to the God of truth." Moreover, in favour of free-will an appeal has been made to "common sense," that is, to the irresistible conviction and universal consent of mankind. To this purpose it has been said, that very few have denied the existence of liberty of choice even in theory; but "this," says a necessarian writer, "is only saying that there have been very few philosophers," as if the denial of liberty of choice were a test of true philosophy. All men, it has been alleged, without excepting professed necessarians themselves, are under the necessity of acting upon the principles of liberty, whatever their hypothetical speculations may be.

All men agree in applauding some actions and condemning others,

others, which would be absurd upon the supposition that men were destitute of free will; all men make a distinction between harm and injury, e. g. between a blow given by design and another occasioned by accident; and the laws of all nations agree to punish an action performed by a man in possession of reason, when they excuse a lunatic; the former being free, and the latter not.

Besides, if man be not, in the strictest sense of the word, a free agent, he can be no moral agent: It is hard to say, what virtue and vice, commendation and blame, mean, if they do not suppose agency, voluntary motion, free choice, and an absolute dominion over our resolutions. Can we applaud or reproach ourselves for what we were no more the causes of than of our own beings, and what it was no more possible for us to prevent than the returns of the seasons, or the revolutions of the planets? On the system of necessity, conscience is an inexplicable principle: its censures or applause are equally futile and groundless: the approbation of mankind is an insult with regard to those on whom it is bestowed, because they can have no merit; and the reproach of men unjust and cruel, because there can be no demerit and ground of blame. Whatever difficulties, therefore, may attend the nature of that influence which we ascribe to motives, (see MOTIVE,) they cannot be the efficient necessitating cause of human actions: since, on this supposition, there could be but one agent in the universe; who must equally be the author of all the good and evil in the world, and on whom must ultimately be charged the sin and misery, as well as the virtue and happiness of his creatures.

Moreover, it has been urged by the advocates of liberty, that if men's determinations and actions flow necessarily from the previous state of their minds and the motives or influences resulting from a nature or condition, imposed upon them without their own consent or choice, the idea of responsibility or accountability must vanish, and there can be no propriety or use of rewards or punishments. God cannot reward without virtue, and there can be no virtue without a self-determining power: he cannot punish without guilt, and there can be no guilt when men do what they cannot avoid doing, and when their actions arise from circumstances in which their Creator placed them.

It is also equally unjust and useless to threaten punishment or inflict it on men to prevent crimes, when they are necessarily determined in all their actions. And if men are necessary agents, though we cannot well admit this verbal contradiction, it can be of no use to reason with them, to admonish or treat them; and God must be insincere in his addresses and invitations, and cruel in his requirements and commands. But such is the whole tenour of revelation, and, therefore, the conclusion is necessary, that man is a free agent, capable of good or evil, and of determining his pursuit of either, from the sole power of his own judgment or will.

"If we adopt the system of necessity," says Dr. Reid, "the terms *moral obligation* and *accountableness*, *praise* and *blame*, *merit* and *demerit*, *justice* and *injustice*, *reward* and *punishment*, *wisdom* and *folly*, *virtue* and *vice*, ought to be disused, or to have new meanings given to them when they are used in religion, in morals, or in civil government; for upon that system, there can be no such things as they have been always used to signify." Another argument for proving that man has power over his own actions and volitions has been deduced from the consideration that he is capable of carrying on wisely and prudently, a system of conduct, which he has before conceived in his mind, and resolved to prosecute. If all the particular determinations, which concurred

in the execution of the plan which such a person had formed, were produced, not by himself, but by some cause acting necessarily upon him, then there is no evidence left that he contrived this plan, or that he ever spent a thought about it. The cause that directed all these determinations so wisely, must be wise and intelligent. If it be said, that this whole course of determinations was produced by motives, motives surely have not understanding to conceive a plan, and intend its execution. We must therefore revert to some intelligent being, who had the power of arranging these motives, and applying them, in their proper order and season, so as to bring about the end. If man, then, had no concern in the execution, we have no evidence left, that he had any concern in the contrivance, or even that he is a thinking being. Man, with all his boasted faculties, is reduced to the state of a mere automaton or machine. Whereas, if wise conduct in a man demonstrates that he has some degree of wisdom, it demonstrates, with equal force and evidence, that he has some degree of power over his own determinations. We shall close this article with observing, that Mr. Abraham Tucker, the acute author of a work entitled "The Light of Nature pursued," by Edward Search, esq. after having argued strenuously against the existence of a liberty of indifference, contends for the existence of free-will, the exercise of which he conceives "to be only a particular species of action, performed in raising up ideas, or fixing them on the mind, which shall determine us to such volitions as we want." He expressly disavows the doctrine of necessity. See on this subject Collins's Enquiry concerning Human Liberty, first printed in 1717. Clarke's Remarks, 1717, and Collection of Papers which passed between Mr. Leibnitz and Dr. Clarke, in 1715 and 1716. Jackson's Vindication and Defence of Human Liberty, 1730. Price's Review of the principal Questions, &c. in Morals, p. 315, &c. edit. 1758. Hartley on Man. Priestley's Doctrine of Philosophical Necessity, 1777. Reid's Essays on the Active Powers of Man, esp. iv. Gregory's Philosophical Essays. Edwards on the Will. Palmer on Liberty. Beattie on Truth. Bellham's Elements of the Philosophy of the Mind, &c. For the objections against liberty, and the arguments in support of necessity, see NECESSITY.

**LIBERTY of conscience**, a right or power of making profession of any religion, or of serving God in any manner that a man sees fit.

This seems to be a natural right; it is vigorously opposed by the generality of the Romanists, and even by many of the reformed, though it seems as if the reformation could scarcely subsist without it. See TOLERATION and PERSECUTION.

**LIBERTY, Moral**, is the power of following, in all circumstances, our sense of right and wrong; or of acting in conformity to our reflecting and moral principles, without being controlled by any contrary principles or habits. See LIBERTY, *supra*.

**LIBERTY, Religious**, is the same with liberty of conscience, and signifies the power of exercising, without molestation, that mode of religion which we think best; or of making the decisions of our own consciences, respecting religious truths, the rule of our conduct, and not any of the decisions of others.

**LIBERTY, Civil**, is the power of a civil society or state, to govern itself by its own discretion: or by laws of its own making, without being subject to any foreign discretion, or to the impositions of any extraneous will or power. Civil liberty, says judge Blackstone, adopting the definition of the Institutes, consists in the power of doing whatever the laws permit; or it is natural liberty, or a power of acting as one thinks fit, without any restraint or controul, unless by the

## LIBERTY.

Law of nature, so far restrained by human laws, and no farther, as is necessary and expedient for the general advantage of the public. Others have defined civil liberty, in contradistinction from political liberty, to be that power over their own actions, which the members of the state reserve to themselves, and which their officers must not infringe. This extends no farther than to a man's own conduct, and signifies the right he has to be exempt from the controul of the society or its agents, that is, the power he has of providing for his own advantage and happiness. It is a man's civil liberty, which is originally in its full force, and part of which he sacrifices when he enters into a state of society.

*Civil liberty*, according to the definition of archdeacon Paley, "is the not being restrained by any law, but what conduces in a greater degree to the public welfare." To do what we will, he says, is natural liberty; to do what we will, consistently with the interest of the community to which we belong, is civil liberty; that is, the only liberty to be desired in a state of civil society. The definition above laid down imports that the laws of a free people impose no restraints upon the private will of the subject, which do not conduce in a greater degree to the public happiness; by which it is intimated, 1st, that restraint itself is an evil; 2dly, that this evil ought to be overbalanced by some public advantage; 3dly, that the proof of this advantage lies upon the legislature; 4thly, that a law, being found to produce no sensible good effects, is a sufficient reason for repealing it, as adverse and injurious to the rights of a free citizen, without demanding specific evidence of its bad effects. This maxim, our author adds, might be remembered with advantage in a revision of many laws of this country; especially of the game laws; of the poor laws, so far as they lay restrictions upon the poor themselves; of the laws against papists and dissenters; and amongst a people enamoured to excess, and jealous of their liberty, it seems a matter of surprize that this principle has been so imperfectly attended to. The degree of actual liberty always bearing, according to this account of it, a reversed proportion to the number and severity of the restrictions, which are either useless, or the utility of which does not outweigh the evil of the restraint, it follows, among other conclusions of a more general nature, that we may hence be enabled to apprehend the distinction between *personal* and *civil* liberty. A citizen of the free republic in the world may be imprisoned for his crimes; and though his personal freedom be restrained by bolts and fetters, so long as his confinement is the effect of a beneficial public law, his civil liberty is not invaded. Another idea of civil liberty places it in security; making it to consist not merely in an actual exemption from the constraint of useless and noxious laws and acts of dominion, but in being free from the danger of having any such hereafter imposed or exercised. The definitions which have been framed of civil liberty are most of them adapted to this idea. Thus one political writer makes the very essence of the subject's liberty to consist in his being governed by no laws but those to which he hath actually consented; another is satisfied with an indirect and virtual consent; another again places civil liberty in the separation of the legislative and executive offices of government; another in the being governed by law, that is, by known, preconstituted, inflexible rules of action and adjudication; a fifth in the exclusive right of the people to tax themselves by their own representatives; a sixth in the freedom and purity of elections of representatives; a seventh in the controul which the democratic part of the constitution possesses over the military establishment. Of these and similar accounts of liberty, it may be observed, that they all labour under one inaccuracy, *viz.* that they describe not fo

much liberty itself, as the safeguards and preservatives of liberty; e. g. a man's being governed by no laws but those to which he has given his consent, were it practicable, is no otherwise necessary to the enjoyment of civil liberty, than as it affords a probable security against the dictation of laws, imposing superfluous restrictions upon his private will. The same remark is applicable to the rest. We may farther observe, that in most of these definitions civil liberty and political liberty are confounded. Upon the whole we may remark, that whatever definitions of either kind of liberty we adopt, that people, government, and constitution is the *freest*, which makes the best provision for the enacting of expedient and salutary laws.

*LIBERTY, Political*, sometimes used, but improperly, as synonymous with civil liberty, in a distinct sense, consists in the share which the members of the state possess in the direction of its affairs, and the power which they reserve to themselves of arriving at the public offices, or, at least, of having votes in the nomination of those who fill them: and this is that which a man may or may not acquire in the compensation he receives for it. In a state of civil liberty, a man retains the most important of his natural rights: in a state of political liberty, he moreover acquires a controul over the conduct of others. It is, therefore, for his advantage to lose as little of the former, and to gain as much of the latter as he can. In countries where every member of the society enjoys an equal power of arriving at the supreme offices, and consequently of directing the strength and the sentiments of the whole community, there is a state of the most perfect political liberty. On the other hand, in countries where a man is, by his birth or fortune, excluded from these offices, or from a power of voting for proper persons to fill them; that man, whatever be the form of the government, or whatever civil liberty or power over his own actions he may have, has no power over those of another; he has no share in the government, and therefore has no political liberty at all. Nay, his own conduct, as far as the society does interfere, is, in all cases, directed by others.

Political liberty is the only safe-guard of civil liberty; and it is chiefly valuable on that account. Civil liberty stands first in the order of things, and political liberty the second. The former is the end, and the latter the means of preserving it. Every man has an absolute and unalienable right to civil liberty; and for the security of it, political liberty should be extended as widely as possible. No man should be excluded from the exercise of it, excepting from circumstances of unavoidable necessity. It may appear, at first sight, to be of little consequence whether persons in the common ranks of life enjoy any share of political liberty or not. But without this, there cannot be that persuasion of security and independence, which alone can encourage a man to make great exertions. A man who is sensible that he is at the disposal of others, over whose conduct he has no sort of controul, has always some unknown evil to dread. He will be afraid of attracting the notice of his superiors, and must feel himself a mean and degraded being. But a sense of liberty, and a knowledge of the laws by which his conduct must be governed, with some degree of controul over those who make and administer the laws, give him a constant feeling of his own importance, and lead him to indulge a free and manly turn of thinking, which will make him greatly superior to what he would have been under an arbitrary form of government. The distinction here made between *civil* and *political* liberty was, we believe, first laid down by Dr. Priestley in his "Treatise on Government."

Mr. Christian, in his edition of Blackstone's Commentary; has

has suggested the difference between civil and political liberty, unnoticed by the learned judge and by other eminent writers. He defines *political liberty* to be the security with which, from the constitution, form, and nature of the established government, the subjects enjoy *civil liberty*.

The importance of liberty, civil and political, as well as religious, to the honour and prosperity of a nation, is sufficiently evinced by both ancient and modern history. It has been observed by the ancients, that all the arts and sciences arose among free nations; and that the Persians and Egyptians, notwithstanding their ease, opulence, and luxury, made but faint efforts towards a relish in those finer pleasures, which were carried towards such perfection by the Greeks, amidst continual wars, attended with poverty, and the greatest simplicity of life and manners. Greece, says Mr. Hume, was a cluster of little principalities, which soon became republics; and being united both by their vicinity, and by the ties of the same language and interest, they entered into the closest intercourse of commerce and learning. There concurred a happy climate, a soil not infertile, and a most harmonious and comprehensive language; so that every circumstance among these people seemed to favour the rise of the arts and sciences. Each city produced its several artists and philosophers, who refused to yield the preference to those of the neighbouring republics. Their contention and debates sharpened the wits of men: a variety of objects was presented to the judgment, while each challenged the preference to the rest; and the sciences, not being dwarfed by the restraint of authority, were enabled to make such considerable shoots, as are, even at this time, the objects of our admiration. Hence, and from other circumstances detailed by Mr. Hume, he concludes, that it is impossible for the arts and sciences to arise, at first, among any people, unless these people enjoy the blessing of a free government. It has been further observed, that when the Greeks lost their liberty, though they increased mightily in riches, by means of the conquests of Alexander; yet the arts, from that moment, declined among them, and have never since been able to raise their head in that climate. Learning was transplanted to Rome, the only free nation at that time in the universe; and having met with so favourable a soil, it made prodigious shoots for above a century; till the decay of liberty produced also the decay of letters, and spread a total barbarism over the world. From these two experiments, of which each was double in its kind, and shewed the fall of learning in absolute governments, as well as its rise in popular ones, Longinus thought himself sufficiently justified in asserting, that the arts and sciences could never flourish, but in a free government; and in this opinion he has been followed by several eminent writers in our own country, particularly Mr. Addison and lord Shaftesbury, who either confined their views merely to ancient facts, or entertained, says Mr. Hume, too great a partiality in favour of that form of government established among us. This writer has alleged, as instances which serve to restrain the extent of the opinion maintained by the celebrated authors above cited, those of modern Rome and of Florence. The former carried to perfection all the finer arts of sculpture, painting, and music, as well as poetry, though it groaned under tyranny, and under the tyranny of priests: while the latter made its chief progress in the arts and sciences, after it began to lose its liberty by the usurpation of the family of Medici. Ariosto, Tasso, Galileo, any more than Raphael and Michael Angelo, were not born in republics. And though the Lombard school was famous, as well as the Roman, yet the Venetians have had the smallest share in its honours, and seem rather inferior to the other Italians in

their genius for the arts and sciences. Rubens established his school at Antwerp, not at Amsterdam. Dresden, not Hamburg, is the centre of potencies in Germany. France has, at a former period, to say nothing now of its present condition, furnished an eminent instance of the flourishing of learning in absolute governments. Although it had scarcely ever enjoyed any established liberty, it has nevertheless carried the arts and sciences as near perfection as any other nation. The English are perhaps greater philosophers, the Italians better painters and musicians, the Romans were greater orators; but the French, says Mr. Hume, are the only people, except the Greeks, who have been at once philosophers, poets, orators, historians, painters, architects, sculptors, and musicians. With regard to the stage, they have excelled the Greeks, who far excelled the English. And in common life, continues the same author, they have, in a great measure, perfected that art, the most useful and agreeable of any, "l'art de vivre," the art of society and conversation. He adds, if we consider the state of the sciences and polite arts in our own country, Horace's observation, with regard to the Romans, may, in a great measure, be applied to the British.

"—— Sed in longum tamen ævum  
Manferunt, hodieque manent vestigia ruris."

It has become an established opinion, that commerce can never flourish but in a free government; and this opinion seems to be founded on a longer and larger experience than the foregoing, with regard to the arts and sciences. If we trace commerce in its progress through Tyre, Athens, Syracuse, Carthage, Venice, Florence, Genoa, Antwerp, Holland, England, &c., we shall always find it to have fixed its seat in free governments. The three greatest trading towns in Europe now, says Mr. Hume at the time when he wrote, are London, Amsterdam, and Hamburg; all free cities, and protestant cities; that is, enjoying a double liberty. Hume's Essays, vol. i. Ess. xiii. and xiv. See *LIBERAL ARTS* and *COMMERCE*.

*LIBERTY, Personal*, consists in the power of locomotion, or of changing situation, or removing one's person to whatsoever place one's own inclination may direct, without imprisonment or restraint, unless by due course of law. See *HABEAS CORPUS*, *IMPRISONMENT*, and *FALSE IMPRISONMENT*.

*LIBERTY of the Press*. See *LIBERTY of the Press*.

*LIBERTY of the Tongue*, in the *Manège*, is a void space left in the middle of a bit, to give place to the tongue of a horse, made by the bit's arching in the middle, and rising towards the roof of the mouth. The bit, according to the various forms of the liberty, acquires different names; hence we say a *snatch-mouth*, a *Pignatelli*, i. e. with the liberty after Pignatelli's fashion, and a *canon-mouth*, with the liberty like a pigeon's neck.

In forging the bit, care must be taken not to make the liberty too high, lest it hurt, or at least tickle the palate, and make the horse carry low. See *BITS*.

*LIBERTY*, in *Mythology*, was a goddess both among the Greeks and Romans. Among the former she was invoked under the title *Eleutheria*; and by the latter she was called *Libertas*, and held in singular veneration; temples, altars, and statues, were erected in honour of this deity. A very magnificent temple was consecrated to her on mount Aventine, by Tiberius Gracchus, before which was a spacious court, called *atrium libertatis*. The Romans also erected a new temple in honour of Liberty, when Julius Cæsar established his empire over them, as if their liberty had been secured by an event which proved fatal to it. In a medal of Brutus, Liberty is exhibited under the figure of a woman, holding in

one had a cap, the symbol of liberty, and two poniards in the other, with the inscription *IDIVS MARTIS*.

**LIBETEN**, in *Geography*, a town of Hungary; 54 miles E.N.E. of Leopoldstadt. N. lat. 48° 47'. E. long. 19° 37'.

**LIBETHRA**, in *Ancient Geography*, a town of Greece, placed by Pausanias on mount Olympus, on the side of Macedonia. M. d'Anville places it upon the river Sus, at a small distance from Hecraclum, which lay to the east, upon the sea-coast. This is said to have been the town where Orpheus was born, and whence his monument was transferred to Dion by the Macedonians, when Libethra was destroyed by an inundation of the river Sus.

**LIBETHRIDES**, in *Mythology*, a surname given to certain nymphs which were supposed to inhabit near mount Libethra in Bœotia, which was distant about 40 stadia from Coronea; and the Libethridian fountain, in Theffaly, led the poets to call the Muses by this name. Virgil, *Ecolg* vii. v. 21.

**LIBICI**, in *Ancient Geography*, a people of Italy, who were planted eastward of the Salassi, in a district now called the lordship of Verceelli. Verceelle, or Vercelli, the capital, stood on the right bank of the Seslino, near Sefia, between Turin and Milan. Istimulum, above Vercelez, was situated at the foot of the Alps, near some gold mines. In that retired corner, there was a grove containing a temple sacred to Apollo.

**LIBILITZ**, in *Geography*, a town of Sweden, in the government of Kuopio; 55 miles E.S.E. of Kuopio.

**LIBISCHAU**, a town of Bohemia, in the circle of Chrudim; 13 miles N. of Chrudim.

**LIBITINA**, in the *Roman Mythology*, a goddess which presided over funerals. This goddess was the same with the Venus infera or Epithymbia of the Greeks. She had a temple at Rome, where was lodged a certain piece of money for every person who died, whose name was recorded in a register called *Libitinæ ratio*. This practice was established by Servius Tullius, in order to obtain an account of the number of annual deaths in the city of Rome, and consequently the rate of increase or decrease of its inhabitants.

**LIBITUM**, in *Music*. Sometimes, in the course of a composition, the Latin words *ad libitum* occur, which signify, at the pleasure of the principal performer, who is at liberty to do what he pleases, in order to manifest his fancy, taste, and execution; and to return to the text of the composer whenever he pleases: as to the rest of the band who accompany him, they are to remain inactive, and await his return to the written melody. The difference between *cadenzas*, and *ad libitum* is, that a *cadence*, or *close*, is terminated by a shake, whereas an *ad libitum* may be allowed to the performer by the composer, at any part of the piece he pleases. These Latin words are likewise joined to some instrument of accompaniment, in the title page of a work; as at the beginning of a piece, to say that such an instrument is *non obligato*, or not absolutely necessary; as in a symphony, when the *corni*, or French horns, may be dispensed with; and in a composition for a pianoforte, when the violin has no solo parts or passages, that will be missed, notice is then given by the words *corni ad libitum*, or "with a violin accompaniment *ad libitum*."

**LIBLE**, in *Geography*, a town of Bohemia, in the circle of Koniggratz; 13 miles E.S.E. of Koniggratz.

**LIBOBO**, a small island in the East Indian sea; on the S.E. coast of Gilolo. S. lat. 10° 43'. E. long. 123° 25'.

**LIBOCH**, a town of Bohemia, in the circle of Leitmeritz; 14 miles S.E. of Leitmeritz.

**LIBONA**, in *Ancient Geography*, a town of Spain, in Celiiberia. Ptolemy.

**LIBONATI**, in *Geography*, a town of Naples, in Principato Citra; four miles E.N.E. of Policeastro.

**LIBONGO**, a town of Africa, in the kingdom of Lo-cango, on the Lusana, near the sea; 50 miles S.S.W. of Bombi.

**LIBONOTUS**, in *Physiology*, one of the twelve winds of the ancients. See *WIND*.

**LIBORA**, in *Ancient Geography*, a town of Spain, in the Tarragonensis, in the country of the Carpetanians; situated on the Tagus, N.E. of Angutobriga, and almost bordering on Lusitania.

**LIBOURNE**, in *Geography*, a town of France, in the department of the Gironde, and principal place of a district. The place contains 8076, and the canton 17,376 inhabitants, on a territory of 117½ kilometres, in nine communes. N. lat. 44° 55'. W. long. 0° 9'.

**LIBRA**, BALANCE, one of the mechanical powers. See *BALANCE*.

**LIBRA** is one of the twelve signs of the zodiac; exactly opposite to Aries; so called because when the sun is in this sign, at the autumnal equinox, the days and nights are equal, as if weighed in a balance.

The stars in this constellation, according to Ptolemy, are seventeen; Tycho ten; Hevelius twenty; and Flamsteed fifty-one. See *CONSTELLATION*.

**LIBRA** also denotes the ancient Roman pound, borrowed, as some have said, from the Sicilians, who called it *libra*, λιβρα.

Mr. Pinkerton (*Essay on Medals*, vol. i. § 7.), though he allows that the Greek pound in Sicily was called λιβρα, as it was in Greece, and divided into 12 ογραμια, or ounces, and that the Roman word libra is derived from the Greek λιβρα, will not admit the as or libra, a coin, to have been deduced from a Sicilian medal. The Sicilians had a coin called λιβρα, but it was of silver, and equal to the obolus of the Egeian standard, ten of which constituted the Sicilian τετραλιβρον. The Syracusans, it is well known, were the chief people of Sicily, and they were a colony from Corinth. Gronovius takes pains to prove, that the standard of Egina was used at Corinth, and of course in Syracuse; but all the Corinthian coins now remaining are upon the Attic model, which circumstance at once confutes all his arguments; and it appears from Aristotle, as quoted by Pollux, that the Sicilians had a money talent, or standard, of their own. The λιβρα, or Sicilian silver obolus, contained also, like the Roman primitive as, 12 ογραμια, or chalcis, so called at first because they weighed an ounce, but afterwards because twelve of them went to the silver λιβρα, as twelve ounces to the pound. It is of the Sicilian λιβρα, or libella, says Mr. Pinkerton, that Varro speaks, when he says it was of silver; and not of the Roman libella, or as, which we may safely suppose was never struck in that metal. For after the Punic wars, of which Sicily was the grand scene, the Sicilian coins must have been frequent at Rome, and the Roman in Sicily. But the Greeks, or Phœnicians, of which nations the chief towns of Sicily were colonies, never knew such coins as the as libralis, or any of its parts; and it is well known that the ancient colonies commonly followed the plan of their parent countries. And though it must be granted, that the Sicilians had their own standard, it yet bore a resemblance of the Greek; their λιβρα being equal to the Egeian obolus, and their τετραλιβρα the drachma of Egina; and it is not to be supposed that when the Greek of brass coinage was always of the most minute form, they should coin pieces of that metal weighing

weighing a pound. Mr. Pinkerton cannot agree in opinion with those, who strenuously maintain, that the Roman silver denarius owes its origin to the Sicilian *Δεκαλίτρον*. The *Δεκαλίτρον*, containing 10 *λίτρα*, or Eginia oboli, would weigh about 180 grains, whereas the Roman denarii do not amount to above 60, or a third part. There seems, therefore, to be no connection between the two. Upon the whole Mr. Pinkerton is convinced, that the Romans did not derive one idea of their coinage from Sicily; but that the Sicilians had their *λίτρα*, divided into 12 *ουγκια*, from the Etruscans; though, according to the more elegant Greek plan, they made the first a small coin in silver, and never struck any brass coin larger than the *ουγκια*, or piece of an ounce weight; if, indeed, the Sicilians had not this idea of 12 *ουγκια* to the *λίτρα* from the Romans themselves, which is much more probable, than that the Romans had it from Sicily. It is a further and stronger argument against the opinion of the Roman coinage being copied from the Sicilian, that, though we have innumerable Sicilian coins in every cabinet, yet not one of them resembles the Roman *As libralis*, or its early divisions, in the very smallest degree. This argument Mr. Pinkerton deems to be conclusive. Besides, in most cabinets there are Etruscan coins upon the exact scale of the *As libralis*, and of its several parts; whence it follows of course, that these, and these alone, must have afforded a pattern to the primitive Roman coinage. The Etruscans, to whom the most ancient brass coins found in Italy are known to belong, are more a colony from Lydia, a country to which Herodotus ascribes the first invention of coinage. See COINAGE.

The libra was divided into twelve uncies, or ounces, and the ounce into twenty-four scruples.

The divisions of the libra were the *uncia*, one-twelfth; the *sextans*, one-sixth; the *quadrans*, one-fourth; the *triens*, one-third; the *quincunx*, five ounces; the *semis*, six; the *septunx*, seven; the *bes*, eight; the *addrans*, nine; the *destans*, ten; *deunx*, eleven; lastly, the *as* weighed twelve ounces, or one libra.

Learned writers are not agreed as to the true weight of the Roman pound. Villalpandus and Greaves, relying on the coins of Vespasian for its standard weight, have from hence attempted to determine this intricate question. This Roman congius contained ten pounds weight of wine; Villalpandus found by filling it to the narrow part of the neck, with spring water, that it contained just ten modern Roman pounds, which are equal to 52560 Troy grains. Azout filled it to the same height, and, having weighed its contents twice, found a result very nearly agreeing with Greaves's measure, stated by Millet, in Phil Trans. vol. li. p. 790. His greater weight was 63024 Paris grains, equal to 51699½ Troy; his lesser, 62760 Paris grains, equal to 51482½ Troy. The mean between both is 51501½ Troy grains, which, divided by 10, give 5159½ such grains for the weight of the ancient Roman pound. Several objections have been made to this pound derived from the congius, which Mr. Raper, *ubi infra*, has collected into one view; from which he infers, that it is more probable, that this standard should give too great a Roman pound, than too small a one. But as the result from hence must be uncertain, he has recourse to the coins. Having weighed nine gold pieces in the Pembroke collection, containing 34½ Roman scruples, he found their weight to amount to 608 Troy grains, which divided by 34½, give 17½ for the scruple, whence the Roman pound should weigh 5075½ grains. From some other coins of the same kind, a scruple appears to be 17½ grains. Instead of this scrupular standard, an-

other was introduced by Sylla; and from the heaviest of four pieces of this standard, allowing thirty of them to have been coined out of the Roman pound, its weight is found to be 5040 grains. The standard of forty in the pound, mentioned by Pliny, succeeded this of Sylla, and continued to the establishment of the monarchy under Augustus; and from ten different coins of this standard, he deduces a mean aureus of 126  $\frac{1}{7}$  grains; and supposing the aureus of forty in the pound to weigh 126 Troy grains, the Roman pound must weigh 5040. In Pliny's time forty-five aurei were struck out of the pound; and the mean aureus from Nero to Titus, in whose reign Pliny died, was under 112 grains; and if the standard weight of the imperial aureus of forty-five in the pound did not exceed 112 grains, the Roman pound will weigh 5040 grains, as it is found from the consular aureus. Soon after the reign of Alexander Severus, in whose time the aureus came to be called solidus, the coinage became very irregular, till Constantine entirely modelled it anew, by coining seventy-two solidi of four scruples out of the pound of gold. From twenty-nine of these solidi in the interval from Constantine to Heraclius, it appears that the mean weight is 69 grains, which, multiplied by 72, gives but 4968 grains for the Roman pound. But if the standard weight of this coin amounted to 70 grains, the pound will weigh 5040, as before. If we take 5040 Troy grains for the weight of the Roman pound, the scruple will weigh 17½ grains; the consular aureus 126; the imperial aureus 112, and the solidus 70; and the consular denarius of 84 in the pound will weigh just 60 Troy grains. (Phil. Trans. vol. lxi. part ii. p. 462, &c.) The common Roman pound, still used at Rome, consisted of 12 ounces, of 458 grains each, equal to one ounce avoirdupois; but the money ounce seems to have had only 420 Troy grains in the pound 5040. See farther on this subject the articles DENARIUS and MILLARENIS.

The Roman libra was used in France for the proportions of their coin till the time of Charlemagne, or perhaps till that of Philip I. in 1093, their sols being so proportioned, as that twenty of them are equal to the libra.

By degrees, it became a term of account; and every thing of the value of twenty sols, was called a *livre*.

*LIBRA Pensit*, in our *Law Books*, denotes a pound of money in weight.

It was usual, in former days, not only to tell the money, but to weigh it; because many cities, lords, and bishops, having their mints, coined money, and often very bad too; for which reason, though the pound consisted of twenty shillings, they always weighed it.

*LIBRARI*, among the ancients, were a sort of copyists, who transcribed in beautiful, or at least legible, characters, what had been written by the notarii in notes and abbreviations.

*LIBRARY*, an edifice or apartment destined for the placing of books; or the collection of books themselves lodged therein. See Book.

Some authors refer the origin of libraries to the Hebrews; and observe, that the care these took for the preservation of their sacred books, and the memory of what concerned the actions of their ancestors, became an example to other nations, particularly to the Egyptians. Osmandus, king of Egypt, is said to have taken the hint first; who, according to Diodorus, had a library built in his palace, with this inscription over the door, ΨΥΧΗ ΙΑΤΡΕΙΟΝ. Nor were the Ptolemies, who reigned in the same country, less curious and magnificent in books.

The scripture also speaks of a library of the kings of Persia, Ezra, v. 17. vi. 1. which some imagine to have consisted of the historians of that nation, and of memoirs of the affairs of state; but in effect it appears rather to have been a depository of laws, charters, and ordinances, of the kings. The Hebrew text calls it the *house of treasures*, and afterwards the *house of the rolls*, where the treasures were laid up. We may, with more justice, call that a library, mentioned in the second of Eldras to have been built by Nehemiah, and in which were preserved the books of the prophets and of David, and the letters of their kings.

The first who erected a library at Athens, was the tyrant Pisistratus; and yet Strabo refers the honour of it to Aristotle. That of Pisistratus was transported by Xerxes into Persia, and was afterwards brought back by Seleucus Nicator to Athens. Long after, it was plundered by Sylla, and re-established by Hadrian. Plutarch says, that under Eumenes there was a library at Pergamus, containing two hundred thousand books. Tyrannion, a celebrated grammarian, contemporary with Pompey, had a library of three thousand volumes. That of Ptolemy Philadelphus, according to A. Gellius, contained seven hundred thousand, all in rolls, burnt by Cæsar's soldiers. See ALEXANDRIAN.

Constantine, and his successors, erected a magnificent one at Constantinople; which, in the eighth century, contained three hundred thousand volumes, all burnt by order of Leo Isaurus: and, among the rest, one in which the Iliad and Odyssey were written in letters of gold, on the guts of a serpent.

The most celebrated libraries of ancient Rome, were the Ulpian, and the Palatine. They also boast much of the libraries of Paulus Æmilius, who conquered Perseus; of Lucilius Lucullus, of Æmilius Pollio, Atticus, Julius Severus, Domitius, Serenus, Pamphilus Martyr, and the emperors Gordian and Trajan.

Anciently, every large church had its library; as appears by the writings of St. Jerom, Anastasius, and others. Pope Nicholas laid the first foundation of that of the Vatican, in 1450. It was destroyed by the confiable Bourbon in the sacking of Rome, and restored by pope Sixtus V. and has been considerably enriched with the ruins of that of Heidelberg, plundered by count Tilly in 1622. One of the most complete libraries in Europe, was said to be that erected at Florence by Cosmo de Medicis; over the gate whereof is written, *LABOR ÆSQUE LAORE*: though it has been since exceeded by that of the late French king; begun by Francis I., augmented by cardinal Richelieu, and completed by M. Colbert.

The emperor's library at Vienna, according to Lambecius, consists of eighty thousand volumes, and fifteen thousand nine hundred and forty curious medals.

The Bodleian library at Oxford, built on the foundation of that of duke Humphry, exceeds that of any university in Europe, and even those of all the sovereigns of Europe, except the emperor's, and late French king's, which are each of them older by a hundred years. It was first opened in 1602, and has since found a great number of benefactors; particularly Sir Robert Cotton, Sir H. Savil, archbishop Laud, Sir Kenelm Digby, Mr. Allen, Dr. Pococke, Mr. Selden, and others. The Vatican, the Medicean, that of Bessarion at Venice, and those just mentioned, exceed the Bodleian in Greek manuscripts; which yet outdoes them all in Oriental manuscripts.

As to printed books, the Ambrosian at Milan, and that of Wolfenbuttle, are two of the most famous, and yet both inferior to the Bodleian.

LIBRARY, *King's*, at St. James's, was founded by Henry, eldest son of James I. and made up partly of books, and partly of manuscripts, with many other curiosities, for the advancement of learning. It has received many additions from the libraries of Isaac Casaubon, and others.

LIBRARY, *Cottonian*. originally consisted of nine hundred and fifty-eight volumes of original charters, grants, instruments, letters of sovereign princes, transactions between this and other kingdoms and states, genealogies, histories, registers of monasteries, remains of Saxon laws, the book of Genesis, thought to be the most ancient Greek copy extant, and said to have been written by Origen in the second century, and the curious Alexandrian copy or manuscript, in Greek capitals. (See ALEXANDRIAN.) This library is kept in the British Museum, with the large and valuable library of Sir Hans Sloane, amounting to upwards of forty-two thousand volumes, &c. There are many public libraries belonging to the several colleges at Oxford and Cambridge, and the universities in North Britain. The principal public libraries in London, beside that of the Museum, are those of the College of Heralds, of the College of Physicians, of Doctor's Commons, to which every bishop, at the time of his consecration, gives at least 20*l.* sometimes 50*l.* for the purchase of books; those of the Gray's Inn, Lincoln's Inn, Inner Temple, and Middle Temple; that of Lambeth, founded by archbishop Bancroft in 1610, for the use of succeeding archbishops of Canterbury, and increased by the benefactions of archbishops Abbot, Sheldon, Tenison, and Secker, and said to consist of, at least, fifteen thousand printed books, and six hundred and seventeen volumes in manuscript; that of Red-Cross Street, founded by Dr. Daniel Williams, a presbyterian divine, and since enriched by many private benefactions, and by an annual fund appropriated to its increase; that of the Royal Society, called the Arundelian or Norfolk library, because the principal part of the collection formerly belonged to the family of Arundel, and was given to the society by Henry Howard, afterwards duke of Norfolk; in 1666, which library has been increased by the valuable collection of Francis Aiton, esq. in 1715, and is continually increasing by the numerous benefactions of the works of its learned members, and others; that of St. Paul's, of Stion College, the queen's library, erected by queen Caroline, in 1737; and the surgeon's library, kept in their hall in Lincoln's Inn Fields; the Westminster library, the library of the Royal Institution, incorporated in 1800; the library of the London Institution, established in 1805; those of the Surry Institution and Ruffell Institution, &c. &c.

Where a library is erected in any parish, it shall be preserved for the uses directed by the founder; and incumbents and ministers of parishes, &c. are to give security for it, and make catalogues of the books, &c. None of the books shall be alienable, without consent of the bishop, and then only when there is a duplicate of such books. If any book shall be taken away and detained, a justice's warrant may be issued to search for, and restore the same: also, action of trover may be brought in the name of the proper ordinary, &c. And bishops have power to make rules and orders concerning libraries, appoint persons to view their condition, and enquire of the state of them in their visitations. (Stat. 7 Anne, cap. 14.) Bray's Institution for parochial libraries is under the direction and management of a number of associates, a treasurer and secretary. See the biographical article THOMAS BRAY.

LIBRARY, *Musical*. Dr. Burney complains, in the second vol. of his General History of Music, p. 444, that in his

his travels through France, Italy, Germany, Holland, and the Netherlands, in search of materials for his work, he was able to find no complete musical library. "Something like a chain or series of musical theorists (he says) may perhaps be found at Vienna, where the emperor Leopold I. began to form a musical library; and the elector of Bavaria another at Munich in the seventeenth century. But both have been long neglected, and are now in a very confused and imperfect state. Nor is a complete series of musical compositions by the best masters, from the earliest period of counterpoint to the present time, to be found in any public or private library in Europe, to which I have ever had access. Indeed the collectors of books for royal, collegiate, or public libraries, seem never to have had an idea of forming any regular plan for making such a collection; and though many individuals have been possessed of a rage for accumulating musical curiosities, it has seldom happened that they have extended their ideas to musical productions in general; so that no more than one class or species of composition has been completed by them, and even this, at the death of the proprietor, is usually dispersed.

"In a library, formed upon so large a scale as that of the king of France at Paris, the Bodleian, and Museum in England, it seems as if music should be put on a level with other arts and sciences, in which every book of character is procured. In a royal or ample collection of pictures, specimens at least of every great painter are purchased, and no private library is thought complete while the writings of a single poet of eminence are wanting."

As the author, in a note upon this passage has given a sketch of such a musical library as he thinks wanting, and which has been inserted in the *Ecyelopédie Methodique*, we shall give it a place here, in his own words.

In forming such a musical library as would assist the student, gratify the curious, inform the historian, and afford a comparative view of the state of the art at every period of its existence, it were to be wished that the books, when collected, were classed in a way somewhat like the following:

Masses	} to Latin words,	} From the infancy of counterpoint to the year 1500.
Motets		
Madrigals	} In modern lan- guages,	
Songs in parts, and single songs		

The same continued to the year 1600; to which should be added:

Services and full anthems	} To English words, as well as those of other modern languages.
Verse and solo anthems	
Psalms, in two or more parts	

The same classes completed to the year 1700, with the addition of masques, intermezzi, serenatas,

- Operas, serious and comic.
- Otorios.
- Cantatas.
- Fantasia and Recercari, for various instruments.

All the above continued to the present time, with an addition of full

- Concertos, symphonies, and overtures.
- Concertos, with solo parts for particular instruments.
- Quintets.
- Quatuors.

Sonatas, or trios, duets, and Solos for every instrument for which music has been composed, including voluntaries for the organ, and lessons for every species of keyed instrument.

The music published in single parts should be scored, and that published in partition transcribed, in single parts; to be alike ready for the eye or the ear, for the theorist to examine, or the practical musician to perform.

And in order that science and criticism may keep pace with the mechanism and practice of the art, all the treatises, tracts, and essays, both in the dead and living languages, should be collected, arranged chronologically, and assigned a particular portion of the library.

The Bodleian library, the Museum, and Royal Society, with some other libraries, have copies of new books sent to them, by the Stationers' company, and by individuals either by law or by courtesy; and when once such a foundation of old music is laid as we have here sketched out, it would soon become a custom, or might be made one by the legislature, for copies of all music that is published in England, as well as books on the subject, to be presented by the authors or editors to the public library. And the same means should be used for procuring all foreign musical publications as are employed in accumulating books from all parts of the globe, where the press is at work.

The librarian, *custode*, or keeper of these books, should be a good practical musician, as well as theorist and scholar, in order to know the worth of the productions he has in charge, and to be enabled to give instructions at least how to draw single parts from a score, and score single parts; to explain difficulties to the ignorant, and display curiosities to the learned; to know the rank each composer should hold in every class, and perhaps record the degree of respect that has been paid to him by his contemporaries, and which is due to him from posterity.

**LIBRATA TERRE**, a portion of ground, containing four oxgangs, and every oxgang thirteen acres.

It was anciently so much land as was yearly worth 20s. and in Henry III.'s time, he that had *quindecim libratas terre*, was to receive the order of knighthood.

Some say, that as money is divided into pounds, shillings, pence, and farthings, the same degrees are to be observed in the division of lands; and, therefore, as *quadrans* signifies a farthing, so *quadrantata* is the fourth part of an acre; *obolata*, an half; *denariata*, a whole acre; *solidata*, 12 acres; and *librata*, 20 times 12 acres; i. e. 240 acres.

This is the same with what in Scotland is called *pound-land* of old extent.

**LIBRATION** of the Moon, in *Astronomy*. Few persons are unacquainted with the remarkable circumstance, that the moon always presents nearly the same face to the earth. Sometimes, however, we see rather more of the eastern, and sometimes rather more of the western hemisphere than at other times. The same occasional variation is likewise observable in the north and south hemispheres. This sensible oscillation, partly real and partly apparent, is called the libration of the moon.

Galileo was the first astronomer who observed and attempted to explain the libration of the moon; his explanation was, however, very imperfect, not being aware that the most considerable part of the libration arises from the unequal motion of the moon in its orbit, as was first discovered by Hevelius in 1654. Laplace gives the following popular explanation of the astronomical appearances connected with the libration. For the physical explanation the reader is referred

ferred to a memoir of Lagrange (Memoires de l'Academie) which obtained the prize in 1764, and likewise to the Berlin Memoirs, 1760, in which the same author has investigated this subject at great length.

To form a just idea of the principal causes of this phenomenon, we should consider the disk of the moon, when seen from the centre of the earth, as terminated by a great circle of the lunar globe, perpendicular to its radius vector (a line joining the centres of the earth and moon); on the plane of this great circle, that hemisphere of the moon which is presented to the earth is projected, and the various appearances of this hemisphere are connected with the rotatory motion of the moon on its axis. If this motion did not exist, its radius vector would trace a great circle on its surface, every part of which would be successively turned towards us, during every lunar revolution. But at the same time that the radius vector would describe this circumference, the moon, by its revolution, brings very nearly the same point of its surface to the radius, and consequently turns the same hemisphere towards the earth. The inequalities in the moon's motion produce some slight variation in the appearance of this hemisphere; for as the motion of rotation does not partake perceptibly of these inequalities, it is variable with respect to the radius vector, which thus intersects its surface at different points. The lunar globe, therefore, makes, with respect to this radius, oscillations corresponding to the inequalities of its motion, which cause some part of its surface to be alternately concealed, and exposed to our observation.

This libration, referred to the ecliptic, is called the *libration in longitude*. But the moon has another *libration in latitude* perpendicular to this, and by which the parts near the poles of the axis of rotation of this globe alternately appear and disappear. To comprehend this phenomenon, let us suppose the axis of rotation to be perpendicular to the ecliptic. When the moon is in its ascending node, these two poles will be at the northern and southern extremity of the visible hemisphere. In proportion as the moon is raised above the ecliptic, the northern pole and the parts surrounding it will disappear, while the regions near the south pole will become more and more visible, till the moon, having arrived at its greatest northern latitude, will return again towards the ecliptic. These phenomena will then be reproduced in the reverse order; and when the moon, having reached its descending node, passes below the ecliptic, the north pole will present the same phenomena as the southern one had offered.

The axis of rotation of the moon is not always perpendicular to the ecliptic, and its inclination produces appearances which may be understood by supposing the moon to move upon the plane of the ecliptic, so that its axis should always remain parallel to itself; it is obvious that then each pole will be visible during half a revolution of the moon round the earth, and invisible during the other half, so that the regions which surround them will be alternately visible and invisible.

And lastly, the observer is not at the centre of the earth but at the surface. It is the visual ray drawn from his eye to the visible hemisphere, which determines the middle of the visible hemisphere, and it is clear that from the effect of the lunar parallax, this radius cuts the surface of the moon at different points, according to its height above the horizon.

All these causes produce only an apparent libration of the lunar globe; they are mere optical illusions, and do not affect its real motion of rotation; it is nevertheless true, that this rotation may be subject to some small irregularities, but they have not yet been detected by observation.

It is not the same with the inequalities of the lunar equator. In endeavouring to determine its position by observations of spots on the moon, Dominique Cassini was led to this remarkable result, which contains all the astronomical theory of the real libration of the moon. If we conceive a plane to pass through the centre of the moon, perpendicular to its axis of rotation, which plane will coincide with that of the equator; if, moreover, we imagine a second plane parallel to that of the ecliptic, and a third plane, which is the mean plane of the lunar orbit, these three planes will always have a common intersection. The second plane, situated between the two others, forms with the first an angle of about  $1^{\circ} 30' 10''$ , and with the second, an angle of  $5^{\circ} 8' 49''$ . Thus the intersections of the lunar orbit with the ecliptic or its nodes, always coincide with the mean nodes of the lunar orbit, and, like them, have a retrograde motion, whose period is  $18^{\circ} 22' 7'' 13' 17''$ . In this interval the two poles of the equator and of the lunar orbit describe small circles parallel to the ecliptic, in such a manner, that these three poles are constantly situated on a great circle of the heavenly sphere.

*LIBRATION of the Earth*, is a term applied by some astronomers to that motion, whereby the earth is so retained in its orbit, as that its axis continues constantly parallel to the axis of the world. See PARALLELISM.

This Copernicus calls the *motion of libration*; and may be illustrated thus: Suppose a globe, with its axis parallel to that of the earth, painted on the flag of a mast, moveable on its axis, and constantly driven by an east wind, while it falls round an island; it is evident, the painted globe will be so librated, as that its axis will be parallel to that of the world, in every situation of the ship.

**LIBSHAUSEN**, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 15 miles S.W. of Leitmeritz.

**LIBUN**, a town of Bohemia, in the circle of Boleslaw; 16 miles N.E. of Jung-Buntzel.

**LIBURNIA**, in *Ancient Geography*, a province of Illyria, along the Adriatic sea, over-against Italy, between Dalmatia on the south, and Istria on the north. This peninsula runs into the sea between the rivers Tedanus and Titius, now the Zermagne and Kerka, the latter of which was in the Roman times the boundary between Liburnia and Dalmatia. Zara, anciently Jadera, and afterwards Diadora, was once the capital of Liburnia. The ruins of Burnum, the Liburnia of Strabo, are to be seen on the right hand of the Titius, or Kerka, in the desert of Bukoviza.

**LIBURNII**, or **LIBURNIANS**, the denomination of one of the three nations which sprang from the Illyrians, having left the country which bore their name in Illyria. They were probably the first people who penetrated into Italy by its northern part, about the sixteenth century before the Christian era, and in process of time settled along the sea-coast. In Italy they were divided into three branches, viz. the Apuli, the Pædiculi, or Padieli, and the Calabri. The country which they inhabited was called Apulia by the Romans, or Japygia by the Greeks.

**LIBYA**, the name anciently given to that part of the world called *Africa* (which see), comprehending in its whole extent Egypt, Marmarica, Cyrenaica, the Syrtic region, Libya proper, Numidia, Mauritania, Libya or Africa interior, Ethiopia, &c.; and bounded on the N. by the Mediterranean, on the E. by the isthmus of Suez, the Red sea or the Arabian gulf, and the Eastern ocean; on the S. by the Ethiopian sea; and on the W. by the Atlantic sea. In a more restricted sense, the name has been applied to that division of Libya or Africa called. "Li-

bya Interior," which lay westwards with regard to the other division of Ptolemy denominated Ethiopia sub Ægypto. The line of division between these two parts, marked by this geographer, passes through Darnis, a city on the confines of Cyrenaica. In this western part, called Libya interior, the inhabitants consisted chiefly of the Gattuli, Garamantes, Nigritæ, and Hesperian Ethiopians, besides many other people, less considerable and less known. See **ÆTULIA**, **GARAMANTES**, and **ETHIOPIA**.

**LIBYA**, a town of Hispania interior. Anton. Itin.

**LIBYA Palus**, a lake of Africa, properly so called. Ptolemy.

**LIBYARCHÆ**, a people of Africa, in Libya, and more particularly in Marmarica, of which they occupied the northern part. Ptolemy.

**LIBYECUM MARE**, or sea of Libya, a name given by the ancients to part of the Mediterranean sea, which adjoined the coast of the Mærotide Libya; bounded on the W. by the sea of Africa, and on the E. by the sea of Egypt.

**LIBYCUS MONS**, a mountain of Egypt, near the city of Thebes. The Nile ran between this mountain and the Sacred mountain.

**LIBYPHÆNICES**, a name given by some authors to the Phœnician colonies established in Africa, in contradistinction to the Syro-phœnicians, or the Phœnicians of Asia.

**LIBYSSA**, a maritime town of Asia, in Bithynia, situated between Chalcedonia and Numidia. It was the place of Hannibal's retreat for avoiding the hatred of the Romans.

**LICANIA**, in *Botany*, Aublet. Guian. 119. t. 45. See **HEDYCREA**.

**LICAVO**, in *Geography*, a town of the island of Corsica; 20 miles E. of Ajazzo.

**LICE**. See **LOUSE**.

**LICE of trees**. See **APHIS**.

**LICEA**, in *Botany*, a genus of *Fungi*, Schrad. Nov. Gen. 16. Pers. Syn. 195, the species of which have been, some of them, referred to *Trichia*, *Sphaerocarpus*, (not the true *Sphaerocarpus* of Micheli, which belongs to the order of *Asce*), and *Didymium*. Its character is thus given by Perfoon.

*Peridium*, (or *case*), naked, roundish, or somewhat indeterminate in shape, brittle. Internal membrane wanting. Seminal powder destitute of fibres.

The species he enumerates are five, all very minute productions, scarcely bigger than pins' heads, found chiefly on rotten wood of the fir kind.

1. *L. bicolor*, the first species, (*Didymium parietinum*; Schrad. Nov. Gen. 24. t. 6. f. 1.) is singular for being found on white-washed mud walls. Its outer case is dark olive, enclosing a quantity of bright yellow powder, which, according to Schrader's generic character of *Didymium*, should be intermixed with fibres. Within is another, much smaller, brown, likewise globular, rather hard and rough case, full of a coarser brown powder.

2. *L. circumscissis*, (*Sphaerocarpus fœcilis*; Bulliard t. 417. f. 5.) is brown and clustered, opening by a circular division. Found in autumn or winter, between the bark and wood of the Aspen-tree.

3. *L. pusilla*, Schrad. Nov. Gen. 19. t. 6. f. 4. is hemispherical, polished, chestnut-coloured, with a blackish powder.

4. *L. variabilis*, *ibid.* 18. t. 6. f. 5, 6, is various in figure and colour, reddish-brown; the powder dirty yellow.

5. *L. flexuosa*, is described by Perfoon as creeping or

oblong, shining red brown, somewhat wavy, with saw-like incisions. These three last are found on fir wood.

Some of Schrader's species are removed by Perfoon to other genera. Albertini and Schweiniz, in their *Conspicetus Fungorum*, have described two new species.

*L. strabulina*, n. 303. t. 6. f. 3, found on the inner sides of the scales of cones of *Pinus Picea*, growing regularly in clusters, brown, with a dull yellow powder.

*L. incarnata*, n. 304. t. 10. f. 6, observed once only, on rotten fir wood in a moist forest, the beginning of October. It is crowded, flesh-coloured with a steely gloss; the powder at first white, then flesh-coloured, finally deep rose-coloured.

**LICENCE**, **LICENTIA**, in *Law*, a power or authority given to another to do some lawful act.

A licence is a personal power, and cannot be transferred to another; though a licence may be granted to a man and his assigns. (12 Hen. VII. 25.) There may be a parol licence, as well as by deed in writing; but if it be not for a certain time, it passes no interest. (2 Nelf. Abr. 1123.) By licence a man may practise physic and surgery in London: licences are also necessary for carrying on various trades and professions, on which a duty is laid, for the purpose of raising a revenue to government. If a lessor license his lessee (who is restrained by covenant from aliening without licence) to alien; and such lessor dies before he aliens, this is no countermand of the licence: so it is if the lessor grants over his estate. (Cro. Jac. 133.) But where a lord of a manor for life granteth a copyhold tenant to alien, and dieth, the licence is destroyed, and the power of alienation ceaseth. (1 Inst. 52.) Copyhold tenants leasing their copyhold for a longer time than one year, are to have a licence for it; or they incur a forfeiture of their estates. (1 Inst. 63.) If any licence is given to a person, and he abuses it, he shall be adjudged a trespasser *ab initio*. 8 Rep. 146.

**LICENCE to alien in mortmain**. Alienations in mortmain to ecclesiastical persons, &c. are restrained by several statutes; but the king may grant licence to any person or bodies politic, &c. to alien or hold lands in mortmain. 27 Ed. I. 7 & 8 W. III. cap. 37.

**LICENCE** is also used, in the *Civil Law*, for a permission or leave granted by a superior.

Justinian appointed four years to be spent in the study of the law; after which, those who had discharged this obligation, were said to have licence or permission to retire from study.

**LICENCE** is also applied to the letters, or certificates, taken out in universities, whether in law, physic, or divinity.

Licence in the Sorbonne, denotes a period of two years, which the bachelors are obliged to pass in assisting at acts, and disputing in them, to qualify themselves for being admitted doctors. See **DEGREE**.

**LICENCE, letter of**. See **LETTER**.

**LICENCE to arise**, in *Law*, *Licentia surgendi*, is a liberty, or space of time given by the court to a tenant, who is essoined de malo leñi in a real action, to rise out of his bed, and go about his business.

**LICENCE for election of bishops**. See **CONGE d'Elire**.

**LICENCE of marriage**. Bishops have power to grant licences for this purpose; and persons marrying any person without publishing the bans of matrimony, or without licence, incur a forfeiture of 100l. &c. by 7 & 8 W. III. cap. 35. See also stat. 26 Geo. II. c. 33. See **MARRIAGE**.

**LICENCE**, in *Painting*, are the liberties which the painter takes

takes in dispensing with the rules of perspective, and the other laws of this art.

**LICENCE, poetical**, is the liberty which poets claim of dispensing with the ordinary rules of grammar.

Anciently poets had much greater licences than are now allowed. The Greeks, by having recourse to the several dialects of their tongue, could lengthen out a word, if it were too short, or retrench something from it, if it were too long. The old poets did what they pleased with their language, and subjected it not only to all their necessities, but their caprices too:

“Et data Romanis venia est indigna poetis.”

But these became ridiculous in course of time; and the poets are now despoiled of most of their ancient privileges.

**LICENCE, in Music**, a seeming breach of rule.

There are licences in harmony as well as in melody. As the laws of counterpoint were at first arbitrary, and formed of narrow and contracted principles, they became subject to change at the caprice or taste of the composer, and at all times, the breach of an old rule by a great master became the establishment of a new one for a composer of inferior fame. At present, except the two fundamental prohibitions of *two 5ths* and *two 8ths* in regular progression, there is no rule that has not been happily infringed, at one time or other, by some man of genius; so that it may be said, perhaps, that whatever does not offend a cultivated ear in harmony or melody, is allowable in music. Of the disallowances of former times, there was none that seemed so inviolable as false relation, such as naturals against sharps, or sharps against naturals: in the perfect concords, as a redundant 5th, a diminished 4th, or a false octave. Yet these licences, of late years, have been so frequently practised, as almost to establish them into rules. The good or bad effect determines the expediency.

If the effect be good, it is a *licence*, if bad, a *fault*. Emanuel Bach, we believe, was the first who ventured to hazard a false 8th, or a sharp against a natural in melody. But Haydn and Mozart having since frequently violated the rule with effect, it almost ceases to be a licence, and every sonata in composition assumes the same privilege. These licences, however, can only be defended on the principle of *apocriphaturas*, as they are certainly inharmonical.

**LICENSED CURATE**. See **CRURATE**.

**LICENSING of Books**. See **LIBERTY of the PRESS**, and **PRINTING**.

**LICENTIA CONCORDANDI**, in *Law*, is that licence for which the king's silver is paid in passing a fine, mentioned in 12 Car. II. cap. 12.

**LICENTIA loquendi**. See **EMPARLANCE**.

**LICENTIA trans fretandi**, a writ or warrant directed to the keeper of the port of Dover, or other sea-port, commanding them to let such persons pass over sea, who have obtained the king's licence for the purpose. Reg. Orig. 193.

**LICENTIATE**, or **LICENCIATE**, he who has obtained the degree of a licence.

Most of the officers of judicature in Spain are known by no other name than that of licentiates. To pass licentiate in the common law, civil law, or physic, they must have studied seven years; in divinity, ten.

**LICENTIA**, among us, is usually understood of a physician, who has a licence to practise, granted him by the College of Physicians, or by the bishop of the diocese.

A person practising physic without such licence, in case

his patient dies under his hands, is guilty of felony in the eye of the law.

**LICETO**, **FORTUNIO**, in *Biography*, a celebrated physician and philosopher, was born at Rapallo, in the state of Genoa, on the 3d of October, 1577, where his father, Joseph Liceto, was also a physician. His education was conducted with great care, and he afterwards spent four years in study at Bologna, which he quitted in 1599. He then settled at Pisa, where he soon obtained the professorship of philosophy, which he filled with so much reputation, that he was invited to the same chair in the university of Padua in 1609, which he occupied until 1636. He removed at that time to Bologna, in consequence of failing to obtain the professorship of medicine, which became vacant by the death of Cremonini. But the Venetian states very soon perceived, and acknowledged the loss which the university of Padua had sustained by the retirement of Liceto; and when a vacancy occurred in the first chair of the theory of physic in 1645, he was induced, by the pressing invitations which were made to him, to return to Padua, where he held the professorship, at an advanced salary, till his death in 1657. He was a very copious writer, having published upwards of fifty treatises upon medical, moral, philosophical, antiquarian, and historical subjects; but they are no longer sufficiently interesting to require a detail of their titles. He was a man of considerable erudition, and an ardent admirer of the doctrines of Aristotle; but displayed little acuteness in research or originality of conception. He wrote a treatise “De Lucernis Antiquorum reconditis,” in which he maintains the opinion, that the ancients were possessed of a secret process for making incombustible lamps, by some mode of condensing the vapour into oil, which returned to the reservoir, and was extremely credulous in respect to the pretended discoveries of sepulchral lamps of this sort. But his opinions were positively refuted by professor Ferrari of Padua, in a treatise, “De veterum lucernis sepulchralibus.” Among his medical writings, his treatise, “De Morborum Causis, Natura, et Differentiis,” is best known; but it is replete with instances of credulity, and with the fables and superstitutions of his predecessors, and contains a classification of the monsters, which had been previously described, without any correction from his own observations. The best edition is that of Gerard Blasius, in 1668. Eloy Dict. Hist. Gen. Biog.

**LICETO**, in *Ornithology*. See **CENOTZQUI**.

**LICH**, in *Geography*, a town of Germany, in the principality of Hohen-Solms, on the Wetter; 12 miles E.S.E. of Wetzlar. N. lat. 50° 31'. E. long. 8° 49'.

**LICHAN**, a town of Corea; 17 miles E.S.E. of Het-sin.

**LICHANOS**, in the *Ancient Music*, is the name of the 3d found of the two lowest tetrachords in the system of the Greeks; as this sound was produced by the index or fore-finger, which was called *lichanos*. The 3d found of the lowest tetrachord ascending, was that of the *hypate*, and called *lichanos-hypaton*, sometimes *hypaton-diatonos*, enharmonic, or chromatic, according to the genus. That of the 2d, or mean tetrachord, was called *lichanos-meson*, or *Meson diatonos*.

**LICHEN**, in *Botany*, *λίχην*, a name borrowed by the Romans from the Greeks for the disease called a tetter, or ringworm, and applied by both to some plant of a mossy nature, growing on stones, which was thought a cure for such complaints. What the *Lichen* of the ancients may have been is very obscure, and the enquiry is given up by

Dillenius himself in despair. He has applied this name to the *Marchantia* of other writers, under which he comprehends the very distinct genera of *Targionia*, *Riccia* and *Sphaerocarpus*; see his t. 78. Linnæus much more happily adopts the *Lichen* of Tournefort and Micheli, whose erulaceous and scurfy nature, in many instances, is associated with the original idea of the word. This Dillenius terms *Lichenoides*, from which he distinguishes *Coralloides* and *Usnea*, but all three are comprehended in the Linnæan *Lichen*.—Linn. Gen. 566. Schreb. 67. Mart. Mill. Dict. v. 3. Hudf. 523. Juss. 7. Tourn. t. 325. Mich. Gen. t. 36—53. Hedw. Theor. 120. t. 30, 31. Lamarck. Illustr. t. 878. (*Lichenoides*; Dill. Mufc. 124. t. 18—30. *Coralloides*; *ibid.* 75. t. 14—17. *Usnea*; *ibid.* 56. t. 11—13.)—Class and order, *Cryptogamia Algæ*. Nat. Ord. *Algæ*, Linn. Juss.

Eff. Ch. Male, scattered powdery warts?—Female, shields or tubercles, in whose disk the seeds are lodged.

Obf. Linnæus takes for male what are now known to be the female flowers, and, *vice versa*, takes for the female those powdery heads, warts or sifures in the frond, which are by some thought buds, by others the male blossoms. We have therefore ventured to reverse his character of this val genus, which properly embraces an entire natural order. (See LICHENES.) It is necessary however here to give a compendious view of *Lichen*, as understood by Linnæus. The species defined in the 14th edition of his *Syftema Vegetabilium* amount to 130; but the insufficiency of this catalogue, to comprize all the Lichens in the world, will be strikingly evident, when we consider that about 345 British species have already appeared in English Botany, and that several more remain to be published there. We shall on this occasion prefer illustrating the nine sections, into which Linnæus has divided his genus, by species of his own, rather than by new ones. Most of these exist in his herbarium, few or none of them being adopted from Dillenius or other cryptogamists, which cannot so generally be said of the Linnæan proper *Mufci*.

SECT. 1. *Leprosi tuberculati*. Twenty-one species.

These consist of a leprous perennial crust, of more or less density, hardness and smoothness, its surface often granulated, sometimes powdery, of various colours, (white, grey, greenish, or yellowish), in different species; the internal substance however is generally very white, often with a green stratum immediately below the actual surface. This crust spreads circularly, with more or less regularity, over stones, rocks, earth, the bark of trees, or even dead wood, to which it frequently adheres so strongly, that, being moreover in some cases very thin, it cannot be separated entire. Fibrous roots, of the cartilaginous or chalky substance of the crust, may be detected in species that grow upon uneven bodies, or on the ground. The circumference or border of the crust is always thin; often marked with a dark-coloured line; occasionally beautifully fibrous and branched. The central part first decays, and finally crumbles away, young plants, of the same or a different species, soon afterwards springing up there from seed; while the marginal boundary of the original crust, if its situation be convenient for the purpose, is sometimes extended to ten times its usual limits.

The crust of the thicker or tartareous species, more especially, is liable to assume a red or purplish hue, from the access of volatile alkali; which is seen when certain animal substances fall upon these plants in their native situations. The observation of this has led to the use of some of them in dyeing; but several of the next and following sections are preferable for this purpose.—The female fructi-

fication, or rather the fruit itself, of this first section, is, or ought to be, convex, without any border; except in a young state, when there is usually a thin margin of its own substance. The disk is most frequently black, in some brown, pale grey, or reddish; and in its solid internal substance are innumerable, vertical, closed cells, each containing about eight minute seeds. It may be observed that the increasing convexity of this disk seems well calculated to allow room for the swelling of the seeds; and finally, by separating or expanding the cells, to promote the escape of their contents. The subjacent crust, under each tubercle, is elevated into its core or centre, so as to form a nucleus there.—Discoveries subsequent to the time of Linnæus have found this section to be rather heterogeneous, as to the affinities of the several kinds, as will be explained hereafter. (See LICHENES.) Our purpose is now merely to indicate the most remarkable species, for the elucidation of our author.

*L. scriptus*. Syst. Veg. ed. 14. n. 1. Linn. Sp. Pl. 1606. (*Lichenoides* *suilla* tenuissima, *pregnaris* velut *litis* inscripta; Dill. Mufc. 128. t. 18. f. 1. *Opegrapha scripta*; Engl. Bot. t. 1813.)—Leprous, whitish, bearing small, black, branched, letter-like lines.—Common on the smooth bark of young trees. The *crust* is a fine, inseparable, whitish film. The *fructification* conveys an idea of Hebrew or Chinese writing, in a very striking manner. This plant however, as understood by Linnæus, Dillenius, and most of their followers till lately, embraces at least 30 known species, together constituting a most natural and distinct genus, of which we shall speak hereafter more than once, under the name of *Opegrapha*.

*L. geographicus*. n. 2. Sp. Pl. 1607. Engl. Bot. t. 245. (*Lichenoides* nigro-flavum, *tubule* geographicæ *in*itar pictum; Dill. Mufc. 126. t. 18. f. 5.)—Leprous, yellowish, with black lines resembling a map.—Frequent on the hard rocks of mountainous countries, and almost as hard itself, at least to the touch, forming broad inseparable patches, of a vivid greenish-yellow, or lemon-colour, curiously streaked and dotted with black marks, composed of the *tubercles*, which are flat, not elevated above the *crust*, frequently confluent or crowded.

Of this species, *atrovirens*, n. 3, is thought to be a variety, or rather an early stage of its growth.

*L. sanguinarius*. n. 9. Sp. Pl. 1607. Engl. Bot. t. 155. (*Verucaria* *sanguinaria*; Hoffm. Pl. Lich. t. 41. f. 1.)—Crust tartareous, white, polished, uneven. Tubercles black, without a border; bright red within.—Found on granite rocks; copiously upon Cromford Moor, Derbyshire; very rarely on the rugged barks of trees. This is extremely remarkable for the internal stains of bright red, perceived when the *tubercles*, and even some parts of the *crust*, are broken; which resembling blood, gave occasion to the very apt name. Several species, destitute of that property, and which otherwise but imperfectly resemble this, are confounded with it by Linnæus, Hudson, Lightfoot, and others.

*L. ventosus*. n. 17. Sp. Pl. 1607. Engl. Bot. t. 906. (*L. cruentus*; Web. Goett. 184. t. 1. *L. flavescens*; Jacq. Mufc. v. 2. 79. t. 9. f. 1. *L. gelidus*; Hudf. 528. *Lichenoides* *tartareum* lividum, *scutellis* rufis, *marginibus* exill; Dill. Mufc. 133. t. 18. f. 14.)—Crust tartareous, rugged, pale sulphur-coloured. Shields irregular, a little swelling, blood-red, with a narrow pale border.—Found on large exposed granite or sand-stones, in mountainous places, forming patches as broad as the hand, easily pared from the rock when moist. The crust is of an elegant pale lemon or sulphur-colour, turning white the second year, but in either case it is strikingly contrasted with the crimson *shield*. These having a permanent border, of a different substance and colour

## L I C H E N.

colour from their disk, are *shields*, not *tubercles*, so that the plant belongs properly to the second section of its genus, of which we shall next give a few examples, and to which it is referred by Murray in Syft. Veg. ed. 14, under Jacquin's name of *flavifens*, so that it occurs twice in that edition.

SECT. 2. *Leprosi scutellati*. Twelve species.

The crust of these is almost universally tartareous, sometimes very thick, less hard than in several of the former, and more easily separable from the stones or bricks on which it may happen to grow. The essential difference resides in the fructification, which consists of flatish shields, or, as Diljenius terms them, saucers, whose elevated permanent margin is of the substance and colour of the crust, not of the disk.

*L. tartareus*. n. 25. Sp. Pl. 1608. Engl. Bot. t. 156. (Lichenoides crustaceum et leprosum, acetabulis majoribus luteis, limbis argenteis; Dill. Musc. 132. t. 18. f. 13.)—Crust tartareous, rugged, granulated, whitish. Shields tawny buff-coloured, with a white margin.—The largest of the crustaceous Lichens; very frequent upon rocks in the north, and important as an article of commerce. The diameter of the *crust* is six, eight or ten inches, and its thickness a quarter or half an inch. The *shields* are frequently half an inch wide, conspicuous for their full buff colour, and white, smooth, wavy border. This species is much used in dyeing, being scraped from the rocks when fully grown, which is about the fifth year of its age, and mixed with volatile alkali and alum. It is sold to the dyers in the form of a purple powder, called *Cudbear*, which being boiled with woollen yarn, communicates any shade of its own colour that may be desired, but does not dye vegetable substances. This colour is by no means permanent, being far inferior, in that respect, to what is given by the Orchard of the Levant, *Lichen Rocella*.

*L. frigidus*. n. 24. Swartz Meth. Musc. 36. t. 2. f. 4. Engl. Bot. t. 1879, found on the Scottish mountains, is pretty generally believed to be a mere variety of *tartareus*, with a thinner *crust*; but it seems to differ in throwing out slender branched brittle processes, not found in the former.

*L. Perellus*. n. 32. Linn. Mant. 132. Engl. Bot. t. 727, is like *tartareus* on a smaller scale, with *shields* of the same white colour as the *crust*, and is used likewise for dyeing purplish colours, chiefly in the fourth of France.

*L. upsaliensis*. n. 33. Sp. Pl. 1609. Engl. Bot. t. 1634, differs from *Perellus* as *frigidus* does from *tartareus*, in having slender awl-shaped bristles protruded from the crust.

*L. subfulvus*. n. 30. Sp. Pl. 1609. Engl. Bot. t. 2109. (Lichenoides crustaceum et leprosum, scutellis subfulvis; Dill. Musc. 134. t. 18. f. 16.)—Crust thin, continued, smoothish, brownish-white. Shields sessile, slightly convex, reddish-brown, with a tumid, whitish, entire border.—This is one of the thinnest, and usually least tartareous, of the present section, and is very common every where on the smooth barks of trees, being distinguished by its copious, bay or chefnut *shields*, whose white smooth border renders them conspicuous. Their disk is sometimes curiously proliferous, which happens also in *tartareus*. Sometimes it is parti-coloured, or mixed with a pale waxy hue, as if withered or abortive there. Numerous species greatly resemble this, but have been distinguished from it and from each other, generally very successfully, by the acuteness of the learned professor Acharius and others.

In this same section Linnaeus places his *candelarius*, see Engl. Bot. t. 1704, but improperly; doublets from his having, at one time or other, confounded with it, as others

have done; the *vitellinus* of authors, Engl. Bot. t. 1792, and *citrinus*, t. 1793. These are all yellow in their *crust* or *frond*, as well as the *shields* of their margins; and serve to give a golden colour to candles, used on festival days in the Swedish churches, by being mixed with the melted wax or tallow.

Some of this section have a lobed, though not easily separable, *crust*, as *knigerus*, n. 29. Engl. Bot. t. 871; and *gelidus*, t. 699. The true *shields* of the latter, whose disk is of a fine pink colour, were not known to Linnaeus, who mistook for the fructification of this rare species certain brown warts, or proliferous excrescences of the crust, which he termed *pelæ*; see his *Mantissa*, 133. Having nevertheless true shields, it properly belongs to this second section. *L. muscorum*, n. 31. Engl. Bot. t. 626, on the contrary, having only a black and evanescent border to its black convex tubercles, should have been placed in the first.

SECT. 3. *Imbricati*. Thirteen species.

The plants of this section do not consist of an adherent *crust*, but approach more or less to a leafy structure, being either of a membranous, cartilaginous or gelatinous texture. The segments spread from a centre, lying over one another like tiles, the central ones being most divided and elevated, the marginal part more depressed, rather plaited than deeply cut, and most dilated outwards. The two sides differ remarkably; the upper being usually either pitted, wrinkled, warty, or besprinkled with mealy cracks, but destitute of hairs, and frequently polished, variously coloured; the under opaque, sometimes pale or white, sometimes quite black, always beset with innumerable fibrous perpendicular radicles, by which it is firmly attached to the bark, wood, earth or stones on which the plants grow. The shields are horizontal, feathered over the upper surface, to which they are attached chiefly by their central part. Their border is of the substance and colour of the frond; the disk somewhat deeper in hue, and much inclined to a chefnut or tawny cast. The mealy warts or cracks in the upper side of the frond are presumed to be the male blossoms, because no other are known. This is a miscellaneous and unnatural combination of species, as will be explained under the next section.

*L. centrifugus*. n. 34. Sp. Pl. 1609. Fl. Lapp. ed. 2. 357. n. 448. t. 11. f. 2.—Imbricated, membranous; greenish-white and smooth above; white, with brownish fibres, beneath; segments linear, divaricated, bluntish. Shields feathered towards the circumference, reddish-brown, with an inflexed, almost entire, border.—This is, according to Linnaeus, extremely common on large stones throughout Lapland, where Lichens that grow on stones are more rare than in other places. It is of all others most remarkable for its centrifugal mode of growth, forming circles a foot or two in diameter, and indeed sometimes, as we are told, eight or ten feet, consisting of a whitish band two or three inches broad, while the central part is quite decayed and obliterated. Linnaeus errs in citing under this a synonym of Diljenius, t. 24. f. 75, which is the *conspersus* of Acharius and Engl. Bot. t. 2097, a species found in various parts of Europe, of a more compact manner of growth and greener colour, with broader lobes and larger, concave, dark chefnut shields.

*L. saxatilis*. n. 35. Engl. Bot. t. 603; and *omphalodes*, n. 36. Engl. Bot. t. 604; are of a more lax and leafy habit than the last, as well as different in colour. The former of them is very common; the latter confined to mountainous rocky heaths or moors. Both are used to dye browns or dull reds in the ruder states of human society, or amongst the inhabitants of the Alps.

*L. parietinus*. n. 43. Sp. Pl. 1610. Engl. Bot. t. 1944. (Lichenoides

(*Lichenoides vulgare sinuofum*, foliis et scutellis luteis; Dill. Musc. 180. t. 24. f. 76.) Imbricated, membranous, stellated, roundly lobed and crisped, orange-coloured; pale and fibrous beneath. Shields of the same colour, with a thin entire border.—One of the most common of its genus, very conspicuous on old walls, as well as on rocks, wooden buildings, trees and bushes. Its rich golden colour is most vivid in exposed situations; assuming an olive, greenish, or greyish cast in the shade and damp. Several species however are perhaps confounded under this by Linnæus and his followers.

*L. stellaris*. n. 45. Sp. Pl. 1611. Engl. Bot. t. 1697, coloured too green.—“Imbricated; leaflets oblong, lacinated, narrow, ash-coloured. Shields brown.” Linn.—Very common on trees. Under this a great number of species are undoubtedly confounded by Linnæus, though Acharius may possibly have gone too far in dividing them. Some are green when wet; others continue grey, whether moist or dry. The shields in all of them are of a greyish-black, not verging towards red, and are usually plentifully produced.

SECT. 4. *Foliacei*. Twenty-six species.

What Linnæus refers to this section are all naturally allied to one or other species of the last, so that the two sections ought to form but one, those of the present being only more leafy, less imbricated, and in some cases quite erect. Nothing however can be more miscellaneous than this division of the genus.

*L. Burgessii*. n. 48. Lightf. Scot. 827. t. 26. Engl. Bot. t. 300.—Gelatinous, membranous, crisped and fringed, of a dark glaucous green. Shields depressed, dark brown, with a leafy, crisped, elevated border.—Found on the trunks of old trees in Scotland and Wales. One of the most elegant of its tribe, consisting of dark-green patches as broad as the hand, of delicate pellucid curled and wavy leaves, bearing numerous shields, very remarkable on account of their leafy, complicated, wreath-like borders. *L. ornatus*, n. 71, is the very same species. When dry the whole frond becomes more opaque, verging towards a lead colour. This belongs to a tribe called gelatinous Lichens, which constitute a very natural genus, now named *Collema*. All agree in their peculiar dark-green colour, semi-pellucid pulpy texture, and reddish or tawny-olive, generally small, shields. Some of them are placed by Linnæus in the former section, others in this.

*L. cilicaris*. n. 49. Sp. Pl. 1611. Engl. Bot. t. 1352; is of the same natural family as *stellaris* of the last order; only larger, more lax, and remarkably fringed.

*L. caperatus*. n. 65. Sp. Pl. 1614. Engl. Bot. t. 654; is in like manner allied to *saxatilis*, &c. and is properly an imbricated species.

*L. islandicus*. n. 50. Sp. Pl. 1611. Engl. Bot. t. 1330. Fl. Dan. t. 155. Hoffm. Pl. Lich. t. 9. f. 1; is celebrated as a restorative medicine in consumptive complaints. This with the three following of this section, *nivalis*, n. 51. Engl. Bot. t. 1994; *juniperinus*, n. 64. Hoffm. Pl. Lich. t. 7. f. 2; and *glauca*, n. 67. Engl. Bot. t. 1606, all elegant species, form a natural assemblage, which Acharius has separated, with some others, under the generic name *Cetraria*. See LICHENES.

*L. ampullaceus*. n. 54. Sp. Pl. 1613. (*Lichenoides tinctorium glabrum vesiculosum*; Dill. Musc. 188. t. 24. f. 82.) see Hoffm. Pl. Lich. t. 13. f. 2. is only a morbid variety of the last, *glauca*, caused apparently by the wound of some insect, which produces a sort of gall. The original specimen of this, having been stolen by a foreigner, more curious than honest, from the Dillenian herbarium about thirty or

thirty-five years ago, was detected by the late professor Sibthorp when abroad, in this person's collection, and recovered. It is not however restored to its original place, where the figure only is now found. But this is of the less consequence, as Mr. Menzies has gathered the plant in the very same state, which has been dissected in our presence, and its importance as a species thus falls to the ground. By the manner in which the history of this Lichen is related by our friend Mr. Turner, Tr. of Linn. Soc. v. 7. 112, it might seem that the excellent professor Von Jacquin was the thief, from which we think it essential to exculpate him, nor did Mr. Turner mean to imply any such thing.

To the section in question belong several species of a very distinct tribe, named *Physcia* by Acharius (but since sunk in his *Parmelia*, the above *Cetraria* being separated from it), of which the following are examples.

*L. farinaceus*. n. 56. Sp. Pl. 1613. Engl. Bot. t. 889. (*Lichenoides segmētis argutioribus*, ad margines verrucosis et pulverulentis; Dill. Musc. 172. t. 23. f. 63.)—Leafy, much-branched, upright, leathery, glaucous-ash-coloured, smooth, pitted; the branches tapering, studded with lateral, convex, pale, mealy warts. Shields scattered, stalked, flat, pale-buff.—Common on trees, but the shields are extremely rare, whence *L. fastigiatus*, Ach. Prod. 175. Engl. Bot. t. 890, came to be taken for the same thing. Its very abundant shields are nearly of the greenish-white hue of the frond, and the mealy warts are wanting.

*L. fraxineus*. n. 61. Sp. Pl. 1614. Engl. Bot. t. 1781, is so common on trees, conspicuous for its large size, and lanceolate figure, that nothing need be said of it.

*L. fuciformis*. n. 61. Sp. Pl. 1614. Engl. Bot. 728. (*Lichenoides fuciforme tinctorium*, corniculis longioribus et acutioribus; Dill. Musc. 168. t. 22. 23. f. 61.)—Leafy, divided, pointed, flat, nearly upright, tapering at each end, greyish-white, obscurely downy, with white mealy warts. Shields convex, blackish.—This is found on granite rocks upon the Cornish coast, but more plentifully in the Mediterranean, the Canary islands, and the East Indies, in which last climate it grows to the length of a foot. It is extremely important as an article of commerce, being used indiscriminately with, and according to some preferred to, the famous *L. Rocella*, for dyeing. See section 8.

SECT. 5. *Coriacei*. Thirteen species.

This is in itself a very natural section, but Linnæus has referred to it one or two species totally foreign to the nature of the rest; as *perlatus*, n. 82. Engl. Bot. t. 341. (*Lichenoides glaucum perlatum*, subtus nigrum et cirrosum; Dill. Musc. 147. t. 20. f. 39.)—This is in habit, texture, and natural affinity, closely allied to *saxatilis*, in sect. 3.—*L. aquaticus*, n. 73. Sp. Pl. 1615; for which a synonym of Dillenius, t. 20. f. 44, is quoted with doubt, has always been involved in much obscurity. The plant of Dillenius is *perforatus* of Jacquin and others, well figured in Hoffm. Pl. Lich. t. 13. f. 1. That of Linnæus, preserved in his herbarium, is said in the Flora Succica to have been found in mossy boggy places at Norrby, near Upsal, his own country residence; but no one has ever discovered what was meant. On a careful examination of the specimen, it proves to be

*L. corrugatus*. Sm. Tr. of Linn. Soc. v. 1. 83. Engl. Bot. t. 1652. Ach. Prodr. 122. (*Lichenoides acetabulis cutaneis et rugosis*; Dill. Musc. 185. t. 24. f. 79.) a plant found on trees throughout Europe, though long neglected by Linnæan botanists, some of the most distinguished of whom have mistaken it for *olivaceus*.

The real coriaceous Lichens, which constitute this fifth section, are, as their denomination implies, of a tough leathery

they texture; smoothish above; strongly veined and bearing numerous coarse radicles beneath. Their fields, called *petle*, or targets, are peculiar, perfectly sessile, and as it were glued to the frond towards its margin, sometimes at its under side! They are oblong or kidney-shaped, often slightly convex; their border merely a thin film which, in a tender state, covers their disk, and finally recedes to the edge as it withers. The plants of this section molly grow on the ground, either at the roots of trees, or on shady mossy banks.

*L. resupinatus*. n. 74. Sp. Pl. 1615. Engl. Bot. t. 305. (Lichenoides fuscum, peltis pollicis ferruginis; Dill. Musc. 206. t. 28. f. 105.)—Coriaceous, creeping, lobed, brownish-grey. Targets oblong, at the under side of each small ascending lobe.—Native of moist shady rocks, or of the mossy roots of trees in mountainous countries. The fronds are imbricated, smooth, of a dull brownish lead-colour, composing broad depressed patches; the targets reddish-brown, concave, plentifully produced, but each solitary at the concave extremity of its own small lobe.

*L. arcticus*. n. 77, and *antarcticus*. n. 78, both one species, are united by Acharius under the name of *Peltidea polaris*, being found in very high northern or southern latitudes only. They are remarkable for the great size of their targets, which grow at the back of the greenish-white frond, and are as big as the thumb-nail, orbicular, of a dark livid flesh-colour.

*L. caninus*. n. 79. Sp. Pl. 1616. Engl. Bot. t. 2299. (Lichenoides digitatum cinereum, lacune foliis sinuosis; Dill. Musc. 200. t. 27. f. 102.)—Coriaceous, dilated, ascending, furrowed, grey; white, with brown veins and fibres beneath; lobes very broad, with marginal fruit-bearing processes. Targets in front, vertical, revolute, roundish, red-brown, with a pale border. The largest, most common, and most famous of its tribe, being the celebrated "Ash-coloured Ground Liverwort," extolled by Dr. Mead as a cure for the bite of a mad dog, whence the above specific name. It was given with black pepper in milk, the patient being first bled, and afterwards bathed in cold water; but whatever accidental circumstances might confirm that famed physician in his opinion, the medicine has long been entirely laid aside.

*L. faccatus*. n. 83. Sp. Pl. 1616. Engl. Bot. t. 288. (Lichenoides lichenis facie, peltis acetabulis immerfis; Dill. Musc. 221. t. 30. f. 121.)—Slightly coriaceous, roundish, creeping; green above; white beneath. Targets scattered, blackish, sunk in pits. Found on the ground among rocks in mountainous countries.

*L. croceus*. n. 84. Sp. Pl. 1616. Fl. Lapp. t. 11. f. 3. Engl. Bot. t. 498. (Lichenoides fubris croceus, peltis appressis; Dill. Musc. 221. t. 30. f. 120.)—Coriaceous, creeping, rounded at the extremities; green above; orange and veiny beneath. Targets scattered, brown, flat.—Found only in the moist alpine situations, near the limits of perpetual snow, growing on the ground.—These two last, elegant and rare productions, are not exactly of the habit of the rest. Acharius, in Schrader's New Journal, v. 1. fasc. 3. 20, 21, has referred them to his new genus *Arthonia* (see LICHENES); from the true species of which they differ in their leafy, not crustaceous, habit, nor is it easy to say to what family they properly belong.

SECT. 6. *Umbilicati*. Eleven species.

A most distinct and natural tribe, constituting the genus *Gyrophora* of Acharius, of which we have spoken in its proper place. (See GYROPHORA.) Linnæus defines these plants as umbilicated, or attached by their centre, and dirty as it were with foot. The latter perhaps may be their male

warts. The fruit exhibits the most essential character in the concentric folds observable in its disk. The first species however, *miniatus*, n. 86. Engl. Bot. t. 593, though it agrees with the rest in its umbilicated habit, differs from them in fructification, in which latter respect it accords with *Endocarpon*; see that article. True *Gyrophora* are

*L. velleus*. n. 87. Sp. Pl. 1617. (Lichenoides coriaceum, latifimo folio umbilicato et verrucoso; Dill. Musc. 545. t. 82. f. 5.)—Umbilicated, stalked, dilated, wavy; brownish-grey and smooth above; covered beneath with black, branched, crowded fibres. Tubercles clustered, flat.—Native of rocks in Lapland and North America. Often as broad as both the hands, tough and leathery, remarkable for its dense, black, hairy clothing beneath. In this last respect indeed it accords with the much smaller, green or olive-coloured, British *pellitus*, Engl. Bot. t. 931, which Hudson mistook for *velleus*.

*L. pululatus*. n. 88. Sp. Pl. 1617. We need not repeat what is laid of this under the article GYROPHORA.

*L. viridis*. n. 96. Linn. Suppl. 451, gathered at the Cape of Good Hope by Thunberg, is *Endocarpon Thunbergii*, Ach. Meth. 129, has nothing of the character of a *Gyrophora*.

SECT. 7. *Scyphiferi*. Nine species.

The natural family of cup-bearing Lichens, or *psycidati*, being one of the most distinct and strongly characterized, has been separated as a genus of itself by most who have considered the subject. (See LICHENES.) The species are extremely confused and difficult to define, being variable in themselves and much resembling each other. Their frond or basis consists of small, rounded, more or less dispersed, horizontal scales, or leaflets; smooth and green or greyish above; pure white beneath, as well as at the edges and within side. In some few instances they are dilated, and lobed or pinnatifid. From these arise upright stalks, terminating in a cup-shaped figure, of a large proportion compared with the leaflets, of a greenish-grey colour, and mealy or scaly surface; the edges of the cup producing the fructification, which consists of small globular tubercles, either brown, or of a most beautiful scarlet, sessile, or variously stalked. Sometimes the cup is proliferous from its edges or centre; sometimes obsolete, or, as it were, starved.—These plants come under the *Coralloides* of Dillenius, t. 14. 15.—Examples are

*L. cociferus*. n. 97. Sp. Pl. 1618. Engl. Bot. t. 2051. (Coralloides scyphiforme, tuberculis coccineis; Dill. Musc. 82. t. 4. f. 7.)—Cup-shaped, leathery, pale greenish-grey, mealy. Cups dilated, somewhat toothed. Tubercles fungous, scarlet. Leaves minute, lobed and crenate.—A beautiful species, not uncommon in woods, or on heaths among ling, or in various dry sandy places. The large scarlet tubercles render it very conspicuous. Several other species indeed have the same coloured fructification, but smaller, and they differ in other respects. The *cupæ* in this are shorter, broader, and more perfect than in any other with scarlet tubercles.

*L. psycidatus*. n. 99. Sp. Pl. 1619. Engl. Bot. t. 1393. (Coralloides scyphiforme, tuberculis fuscis; Dill. Musc. 79. t. 14. f. 6.)—Cup-shaped, leathery, greyish-green, scaly, often proliferous. Cups dilated, nearly entire. Tubercles brown. Leaves minute, imbricated, crenate.—The most common of this tribe, occurring every where, in broad patches, on heaths, sandy banks, and under hedges. Its cup-like shape is usually pretty regular, at least before the tubercles appear; but the edges of the cup, or its centre, occasionally throw up others, even to four or five ranks or stages,

ages, one upon another, in beautiful luxuriance. More frequently the first cup bears unequal and imperfect cups, or tubular stalks, crowned with the brown *tubercles*. The *stalks* of all are frequently leafy or scaly, especially their lower part.

*L. gracilis*. n. 101. Sp. Pl. 1619. Engl. Bot. t. 1284. (Coralloides scyphiforme ferratum elatius, caulibus gracilibus glabris; Dill. Musc. 88. t. 14. f. 13.)—Cup-shaped, long, slender, smooth, cartilaginous, greenish-brown; at length somewhat branched. Cups conical, sharply toothed. Tubercles brown. Leaves minute.—In healthy dry mountainous places, or in woods, in the north, not unfrequent. The character of this is widely different from the two preceding, displayed in its brown hue, tall slender form, and sharp teeth or terminal branches. The *tubercles* are dark brown. *Leaves* very minute, and frequently obliterated.

*L. flammeus*. n. 105. Linn. Suppl. 451. Hoffm. Pl. Lich. t. 3. f. 1; is very improperly referred to this section by Murray, merely, as it seems, on account of its tubular stem and branches. It ought, according to the Linnæan arrangement, to stand in section 3, after *parietinus*, n. 43, and before *physodes*, n. 44, agreeing with the former in colour, with the latter somewhat in structure. We mean not, however, to say there is any considerable real affinity between these three species.

SECT. 8. *Fruticulosi*. Ten species.

A vague section, comprising, though small, several discordant things, of which no general definition can be given, except that they are of an upright bushy habit.

*L. rangiferinus*. n. 106. Sp. Pl. 1620. Engl. Bot. t. 173. (Coralloides montanum, fruticulosi speciei, ubique candicans; Dill. Musc. 107. t. 16. f. 29; et corniculis rufescentibus; t. 16. f. 30.)—Bulky, tubular, very much branched, white and hoary; the little branches divaricated and drooping. Tubercles terminal, globose, mostly clustered, dark brown.—This is the Reinder Lichen, so celebrated by Linnæus, in his Flora Lapponica and Lapland Tour, as the food of that animal. In the wide heathy tracts and forests of those northern regions, it covers the ground like snow, rising to the height of a foot or more; with us it is much humbler and more dispersed; always choosing the most sterile heathy soil, and not very generally producing fruit. Its texture is thin and brittle, soft to the grasp of the hand, and excellent for package, the only use for which it can serve in this climate. The *branches* are occasionally, not always, perforated at their divarications. The surface is hoary, or rough with minute warts. *Tubercles* very small, terminal, abundant when they occur at all.

*L. uncialis*. n. 107. Sp. Pl. 1621. Engl. Bot. t. 174.

*L. vermicularis*. n. 108. Swartz Meth. Musc. 37. Engl. Bot. t. 2029.

*L. subulatus*. n. 109. Sp. Pl. 1621. (Coralloides corniculis longioribus et rarioribus; Dill. Musc. 102. t. 16. f. 26.)

These three are naturally akin to *rangiferinus*. The following are very different.

*L. globiferus*. n. 110. Mant. 133. Engl. Bot. t. 115. (Coralloides cupressiforme, capitulis globosis; Dill. Musc. 117. t. 17. f. 35.)—Shrubby, solid, much branched, cylindrical, brownish and polished; branches with minute divaricated terminations. Fruit globular, smoothish, enclosing a ball of black powder.—This very pretty coral-like production occurs on mountainous rocky heights, or in dry stony woods. Its *stems* compose loose entangled tufts, of a tawny light polished brown, and are white and solid within; the ultimate branches are innumerable, short, slender, tufted, and divaricated. The *fructification* is altogether different

from every thing we have hitherto described, consisting of terminal solitary balls, the size of a vetch seed, smooth, of the substance of the stem, opening by a wide irregular perforation at the top, and containing a globular mass of black condensed powder, presumed to be the seeds. This plant therefore, by its fructification and habit, has every right to constitute a distinct genus, and is now, with the two following, admitted as such by the name of *Spherophoron*. See LICHENES.

*L. fragilis*. n. 113. Fl. Suec. ed. 2. 425. Fl. Lapp. n. 44. t. 11. f. 4. (Coralloides fragile; Hoffm. Pl. Lich. 34. t. 33. f. 3. Spherophoron fragile; Ach. Meth. 135. t. 3. f. 5.)—Shrubby, solid, brittle, ashy brown; branches level-topped, cylindrical, crowded, naked. Fruit globular, rugose, enclosing a ball of black powder.—Found in similar places with the last, with which most botanists, in Britain and elsewhere, have confounded it, taking the following for the true *fragilis*.

*L. compressus*. (*L. fragilis*; Ach. Prodr. 211. Hudf. 558. Engl. Bot. t. 114. *L. melanocarpus*; Swartz Prodr. 147. Spherophoron compressum; Ach. Meth. 135. Coralloides alpinum, coralline minoris facie; Dill. Musc. 116. t. 17. f. 34.)—Shrubby, solid, cartilaginous, white, branched, compressed; branches clustered, somewhat palmate. Fruit depressed, containing a cake of black powder.—The most elegant of this new genus, remarkable for its white coral-like appearance, having the splendour of porcelain when fresh. The above characters mark it sufficiently. The fruit is rare, produced in moist shady situations only. This species seems to prefer limestone rather than granite rocks.

To a very different family belongs

*L. paschalis*. n. 111. Sp. Pl. 1621. Engl. Bot. t. 282. (Coralloides crispum et betryforme alpinum; Dill. Musc. 114. t. 17. f. 33.)—Shrubby, solid, clothed with minute crustaceous leaves. Tubercles terminal, prominent, brown.—This Lichen, found on a calcareous alpine rocks, is destined to perform an important office in the economy of nature, being the first vegetable that takes root upon lava, whose porous surface will admit no crustaceous species. Thus it composes a decaying a portion of vegetable mould, fit for the reception of the seeds of other plants. Its *roots* and *stem* are very tough and strong, and the assidue lapse of minute greyish-brown *leaves*, that cover the whole, gives it a peculiar and distinct aspect. The tubercles are solid, white within, convex, without any border.

Three species only remain, having little or no affinity to any of the above, or to each other.

*L. trifidus*. n. 112. Web. Goett. t. 5. Swartz. Meth. Musc. 37. Engl. Bot. t. 720. This alpine Lichen has real shields. It occurs among the imbricated species, by Jacquin's name of *rigidus*, n. 42; and it is curious that Murray, the editor, has quoted in both places the same synonym of Haller, n. 1966 t. 47. f. 1.

*L. verrucosus*. n. 114. Suppl. 451. (Stereocaulon tabulare; Ach. Meth. 316. t. 7. f. 2.)—Found at the Cape of Good Hope; It consists of dense, broad, white tufts of low branched *stalks*, tumid and globose at their summits, and agrees altogether in genus, very nearly in species, with Mr. Dickson's *oculatus*, Engl. Bot. t. 1833. Yet professor Acharius considers the fructification of *verrucosus* as unknown, and refers the plant to his genus *Stereocaulon*, of which *paschalis*, n. 111, above-mentioned, is a genuine example.

*L. Roccella*. n. 115. Sp. Pl. 1622. Engl. Bot. t. 211. (Coralloides corniculatum fuciculare tinctorium, fuci teretis facie; Dill. Musc. 120. t. 17. f. 39.)—This we have mentioned in speaking of *tartareus*, n. 25; and *fuciformis*, n. 61.

It agrees very much with the latter, except in being cylindrical, and less soft or flexible, and their shields are exactly alike.—A Cape variety, as it is thought to be, of *Rocella*, is partly cylindrical, partly flat, and much dilated.

Seçt. 9. *Filamentosi*. Fifteen species.

A very curious, striking, and, for the most part, very natural assemblage. Many of them hang in long, black, grey, or white clusters, from the branches of aged pines, oaks, or chestnuts, in alpine forests, to which they give a singular and romantic aspect. Their fronds are filamentous, often a foot or more in length, repeatedly branched, either solid, or apparently jointed, in a beard-like manner, with a central tough fibre; sometimes they are compressed, sometimes pitted; in one nondescript species exquisitely reticulated like lace. The fructification is various and uncertain; in some perfect shields with a true disk, and a border like the frond; in others a spurious kind of shield, *orbillus*, is found, along with coloured seed-bearing tubercles; in others, again, powdery warts only are discoverable.

A few examples will suffice.

*L. plicatus*. n. 116. Sp. Pl. 1622. Engl. Bot. t. 257. (*Ufnea vulgaris*, *loris longis* implexis; Dill. Musc. 56. t. 11. f. 1.)—Filamentous, cylindrical, pendulous, whitish; branches entangled. Shields (spurious) whitish-green, radiated. Tubercles yellowish.—Found in ancient woods. The fronds are excessively and finely branched, a foot or two long, pendent in dense clusters from the trees. Their surface is minutely warty. The proper tubercles, described by Acharius, we have never seen. The spurious shields, his *orbilli*, are rare. The latter are improperly made reddish in English Botany.

*L. divaricatus*. n. 119. Syst. Nat. ed. 12. v. 2. 713. (*Ufnea mollis*, *ramis longis compressis*; Dill. Musc. 62. t. 12. f. 5. *U. flaccida*; Hoffm. Pl. Lich. t. 67.)—Filamentous, pendulous, angular, jointed, pale sulphur-coloured; branches divaricated. Shields sessile, chestnut-coloured, with a narrow border of the substance of the frond.—Native of fir woods on the alps of Savoy, Switzerland, &c. Often a foot and a half long, soft and flexible, conspicuous for its yellowish hue. The shields are those of an Acharian *Parmelia*. See LICHENES.

*L. aurantiaco-ater*. n. 128. Jacq. Misc. 369. t. 11. f. 2, (very badly drawn,) seems to us also a true *Parmelia*, though retained in *Ufnea* by Acharius; see his *Methodus*, 307.

*L. capensis*. n. 130. Suppl. 451. (*Ufnea capensis*; Hoffm. Pl. Lich. t. 10. f. 1.) is properly referred by Acharius to his *Parmelia*.

*L. floridus*. n. 129. Sp. Pl. 1624. Engl. Bot. t. 872. Ehrh. Crypt. 148. *Ufnea vulgatissima tenuior et brevior, cum orbiculis*; Dill. Musc. 69. t. 13. f. 13.)—Filamentous, with a central thread, bushy, erect, greenish-grey; branches round, fibrous, warty, with radiated spurious shields. Tubercles on the branches, lateral, flesh-coloured, rugged.—Not uncommon on dead branches of oaks in old woods, but the *orbilli* seldom occur except on the higher trees, and the real tubercles are extremely rare. The latter were supposed to have been published for the first time in Engl. Bot. vol. xiii. in 1801, but the celebrated Schrader appears to have described though not figured them two years earlier. They are conformable to what have long been known in other genuine species of this tribe. We cannot but think *L. hirtus*, n. 125, Engl. Bot. t. 1354, specifically distinct from *floridus*, of which professor Acharius makes it a variety. The tubercles of *hirtus* grow chiefly on the stem or large branches, which are continued straight beyond them, not strongly bent backwards, as in *floridus*. These species

boiled with wool, without alum, dye it of a rich tawny yellow.

The most minute species of this great genus, or natural order, hold a much more important place in the economy of nature than is apparent to superficial observers. They are the first beginning of vegetation on stones of all kinds exposed to the air, whose decomposing surfaces are the receptacle of their imperceptible seeds, and soon afford nourishment to the sprouting plants, whose minute fibrous roots still further insinuate themselves. The larger species take possession of every cavity and fissure, both of stones and the decaying external bark of trees. In time they all decay, and furnish a portion of vegetable mould, capable of nourishing mosses, or still larger plants. The residuum of these, being still more considerable, is washed by rains into larger cavities, where even forest trees can scatter their seeds, by the penetrating power of whose roots, great masses are dislodged from the most lofty rocks. Thus the vegetable kingdom exercises dominion over the tributary fossil world, and, in its turn, affords the same no less necessary aid to animal existence. Nothing in nature is allowed to remain stationary, idle, or useless, and the most inconsiderable agents frequently appear, in the hands of Divine Providence, to be the most irrefragable. S.

LICHEN, in the *Materia Medica*. The *Lichen islandicus* is a native of Britain, particularly on the mountains of Wales and Scotland. In Iceland this is used as food. For this purpose, a dish of it is prepared by chopping it small, boiling it in three or four successive portions of water to take off its natural bitterness, and then for an hour or two in milk. When cold this preparation has the form of a jelly, which is eaten with milk or cream, and makes a very palatable dish. The medicinal qualities of this lichen have of late been so well established at Vienna, that the plant is admitted into the *Materia Medica* of the Edinburgh Pharmacopoeia, and into the London Pharmacopoeia of the year 1809. It is extremely mucilaginous, and to the taste somewhat bitter and astringent; but its bitterness, as well as the purgative quality which it manifests in its recent state, are in a great measure dissipated by drying, or, as we have already observed, may be extracted by infusion in water. An ounce of this lichen boiled a quarter of an hour in a pint of water, yielded seven ounces of a mucilage as thick as that procured by the solution of one part of gum arabic in three pints of water. Lord Dundonald (*Phil. Mag.* vol. x.) has given the following directions for preparing the mucilage from the lichen. The lichen has an outer skin, covering a green resinous substance; and the remainder of the plant consists chiefly of gum and of silicious matter, on which water does not act. In order to separate the outer skin from the resinous matter, the plant must be scalded two or three times with boiling water, which causes the skin to crack, swell, and peel off. It is then put into a boiler with about three quarts of water for every pound of the plant, and about half an ounce of potash or soda, and the boiling should be continued till the liquor acquires a considerable degree of gummy consistence. The liquor is then to be taken out and strained from the plant, and fresh water added to the same material, for the purpose of further exhausting the gum. The several liquors, after standing some hours to settle, and then removing the dregs, are to be boiled down in a regulated heat to the consistence which is required for use, but not further, lest it should burn and become coloured. Two or three boilings will be necessary for entirely exhausting the lichen of its mucilage.

The medicinal virtues of this lichen were probably first

learned from the Icelanders, who employ it in its fresh state as a laxative; but deprived of this quality and properly prepared, it is said to be an efficacious remedy in consumptions, coughs, dysenteries, and diarrhoeas. Dr. Crichton informs us (Med. Journ. vol. x.), that during a residence of seven months at Vienna, he had frequent opportunities of seeing the lichen islandicus tried in phtisis pulmonalis at the General Hospital, and he confesses, "that it by no means answered the expectation he had formed of it." He adds, however, "from what I have seen, I am fully convinced in my own mind, that there are only two species of this disease, when this sort of lichen promises a cure. The two species I hint at, are the *phtisis hæmoptæica*, and the *phtisis pituitosa*, or *mucosa*. In several cases of these I have seen the patients so far get better of their complaints, as to be dismissed the hospital cured; but whether they remained long for or not, I cannot take upon me to say." That this lichen strengthens the digestive powers, and proves extremely nutritious, there can be no doubt; but the great medicinal efficacy attributed to it at Vienna will not readily, says Dr. Woodville, be credited at London. It is commonly given in the form of a decoction, an ounce and a half of the lichen being boiled in a quart of milk. Of this a tea-cup full is directed to be drank frequently in the course of the day. If milk disagree with the stomach, a simple decoction of the lichen in water is to be used. Care should be taken to boil it over a slow fire, and not longer than a quarter of an hour. In the London Pharmacopœia the decoction is directed to be prepared by boiling down an ounce of the lichen in a pint and a half of water to a pint, and then straining it.

The *lichen caninus*, or *cineræus terrestris*, which grows on heaths, dry pastures, and woods, has a weak faint smell, and a sharpish taste. It was for a long time extolled as a medicine of singular virtue in preventing and curing that dreadful disorder which is produced by the bite of rabid animals. The "pulvis antilyssus," a powder composed of equal parts of this lichen and black pepper, was first recommended as a preservative against the rabies canina by Mr. Dampier, brother of the celebrated circumnavigator, and by the authority of sir Hans Sloane, it was published in the Philosophical Transactions, (vol. xx. p. 49.) The quantity of pepper having been found to render the medicine too hot, the powder was afterwards prepared of two parts of the lichen and one of pepper. This powder was afterwards adopted in the London Pharmacopœia in 1721, at the desire of Dr. Mead, who seems to have had repeated experience of its good effects, and who declares that he had never known it to fail, where it had been used, with the assistance of cold-bathing, before the hydrophobia came on. He directs the patient to be blooded to the extent of nine or ten ounces; afterwards a dram and a half of the powder is to be taken in the morning fasting, in half a pint of cow's milk warm, for four mornings successively. After these four doses are taken, the patient is directed to go into the cold-bath every morning for a month, and then three times a week for a fortnight longer. On the character of Mead, the pulvis antilyssus was long retained in the London Pharmacopœia; but on the revision of that book in 1788, it was deservedly expunged. Woodv. Med. Bot. See *ANTILYSSUS Pulvis*.

**LICHEN**, in *Medicine*, a cutaneous eruption, consisting of *papule* (pimples), affecting adults, connected with internal disorder, and usually terminating in scurf. It is not contagious.

Such is the character of an eruption, to which Dr. Willan has appropriated the term *lichen*, in his valuable treatise

on cutaneous disorders. (Order i. Genus ii.) In the writings of Hippocrates, he remarks, the term lichen, or lichenes, (*λιχηνες*) is employed to express an eruption of papule, and he did not include under that appellation any pustular disease. There is, however, an extreme confusion, as in the case of almost every other denomination of cutaneous affections, among the subsequent writers, in the acceptance of the word. The later Greek authors extend the application of it, so as to comprehend a pustular affection of the face, sometimes called *sycofis*, and likewise the *menagra*, a contagious disease, together with the simple and rank lichen (*λιχην αγριος*). Pliny in one passage (Nat. Hist. l. xx. cap. 1.) seems to use the term lichen as synonymous with the *impetigo* of the Latins: he is, however, inconsistent with himself in other places. The only author to whom we can refer for a definition of *impetigo* is Celsus; and his account of it does not, in any respect, correspond to that which the Greeks have given of the lichenes. Under the denomination of *papula*, Celsus has comprised, and accurately described, two varieties of lichen, the *L. agrius*, and *L. circumscriptus*; and he has correctly stated the real relation between the lichen and impetigo, when he says, that "the papula agria, through neglect or improper treatment, is often changed into impetigo." (De Med. lib. v. cap. 28.) Nevertheless, all the translators of the Greek medical writers have used *impetigo* as synonymous with the original term lichen; and their example has been followed by many respectable authors on the subject of cutaneous disorders.

By more modern writers, again, the lichen has been arranged under other genera of disease, with which it has still less affinity than with impetigo. Thus Sauvages describes it under the title of herpes farinosus; and Lorry confounds both lichen and impetigo with herpes: while Plater, Hafensser, and others, arrange lichen under the genus scabies. By adopting the character of the lichen, stated by Dr. Willan, we may avoid this extreme degree of confusion.

An eruption, thus characterized, occurs under five or six varieties of form, to which Dr. Willan has appropriated the following titles: 1. *Lichen simplex* is preceded by symptoms of feverishness, or rather by a state of irritation not amounting to fever, which is relieved after five or six days, on the appearance of the eruption. This consists of distinct red papule, with but little inflammation round their base, first appearing on the face or neck, and spreading thence over the body and limbs. In about a week, the colour of the eruption fades, and the cuticle separates in scurf. The duration of the complaint, however, is seldom in two cases alike; from fourteen to twenty, or thirty days, sometimes intervene between the eruption and the renovation of the cuticle. It occurs, as well as some other of the species, annually about the beginning of summer, or in autumn, in persons of a very weak and irritable constitution. 2. *Lichen pilaris* is merely a modification of the foregoing species, the papule appearing only at the roots of the hairs of the skin. 3. In the lichen *circumscriptus*, or papulated ring-worm, the papule are arranged in clusters, or patches, which are of an irregular form, but with a well-defined margin, and appear in succession on the limbs or trunk of the body, sometimes by repeated eruptions, lasting for six or eight weeks. It is excited both by internal and external causes of irritation, and is at first attended with slight febrile symptoms for a day or two. 4. *Lichen agrius* is preceded by nausea, pain in the stomach and limbs, with shivering and depression of strength for several days, which sometimes diminish when the eruption appears. The papule are distributed in great numbers in various parts of the body, face, and limbs, having a high red

red colour, and being attended with itching, heat, and painful tingling. The redness is augmented, and a sensation of burning and smarting is excited by the warmth of bed, by washing, especially with soap, by violent exercise, or wine. Its duration is uncertain. Women are more liable to it than men; and it affects those especially who have undergone long continued fatigue, watching, and anxiety. In men it is often produced by the intemperate use of spirituous liquors.

*Cure*.—Every thing heating or stimulating should be avoided, whether great exercise, or stimulant food and liquors; gentle laxatives should be used; and the skin should be washed with warm-water, or thin gruel, by which the irritation and itching are alleviated. All frong applications are improper, and aggravate the complaint, producing intolerable smarting. Mild cooling ointments, as the rose-potatum, relieve the uneasy sensations of heat and itching.

Two other varieties of lichen are noticed by Dr. Willan, one of which he terms lichen *lividus*, and the other *L. trospicus*. The former of these is characterised by papulæ of a dark or livid hue, is more permanent than the species before described, and principally affects persons of weak constitutions, who live on a poor diet, and labour hard, or reside in close situations. The lichen is sometimes intermixed with *petechiæ* in the latter cases, or larger purple patches, which point out its affinity with the *purpura*, or land-scurvy. It is cured also by the same means as are successful in the latter disorder; namely, by nourishing food, moderate exercise in the open air, with the use of cinchona and sulphuric acid, or the tincture of muriate of iron. The lichen tropicus signifies the eruption which is well known in hot climates by the appellation of *prickly heat*, of which we have already given some account. See HEAT, *Prickly*.

LICHENASTRUM, in Botany, so called by Dillenius, from its affinity to *Marchantia*, his *Lichen*. See JUNGERMANNIA.

LICHENES, a Natural Order of vegetables of the Cryptogamic class, (*Aspidospora* of Wiggers's *Hollat*. 85.) allied on one hand to the *Algae*, in which it was included by Linnæus, and on the other to the *Fungi*, with many of which it nearly agrees in habit, and with some of them very strikingly in the character and situation of its seeds. This family has risen gradually to the consequence it now holds among botanists, first by the labours of Dillenius and Micheli, and next by those of Linnæus and his pupils; but the celebrated Dr. Acharius, professor at Vadstena in Sweden, has finally elucidated it fully, with respect to characters and synonyms, in several separate works; not merely as a genus, but as a natural order, comprising many genera. Professor Hoffmann indeed, and other German botanists, had already considered it in the same light; but none has so completely treated the whole subject as this learned Swede. For a general view of the nature of this family, with the leading sections to which its species have been reduced, see LICHEN. We shall now proceed to explain what has been done towards its generic sub-division, the first attempt at which, by the fruit, was made in Wiggers's *Primitiæ Fl. Holsaticæ*, a work of which Weber, in a copy before us, claims being the author.

It would be tedious and difficult to trace minutely every step in the progress of those who have at any time adverted to the generic distribution of Lichens. Weber's is but a rude attempt. The labours of Hoffmann, having led the way to Acharius, require some previous explanation.

That writer, in his *Flora Germanica*, v. 2, published in 1795, established an order of *Cryptogamia Scutellata*, as distinct from *Alge*, which is intended to embrace all the certain

*Lichenes*, though it does not, in fact, admit all that are reckoned such by Acharius. It is thus defined.

*Scutellata*. Female fructifications in orbicular, flat or convex fields, radiated or naked, bordered or without a border, or spirally twilled, fixed to the frond either by their centre or their margin; and this frond is either gelatinous, coriaceous, umbilicated, caulescent, strap-like, filamentous, leafy, tartarous, or leprous; its duration perennial, throwing out various buds or offsets. Each field contains seeds within its fibrous or spongy substance.—This order contains nine genera.

1. *Collema*. Frond pellucid, gelatinous. Shields bordered.—This comprehends the gelatinous Lichens of other authors, of which 26 species are here described as natives of Germany. (See LICHEN; sect. 4. n. 48.) *Collema* is recently admitted as a genus in *Engl. Bot. v. 32. t. 2284*, where the essential character is “*Shields orbicular, horizontal, nearly sessile, superficial, with a gelatinous accessory border*.” There can be no doubt of its constituting one of the most natural genera to be found in any order.

2. *Peltigera*. Frond coriaceous. Shields (or targets) compressed, attached by their margin.—The true coriaceous Lichens, sect. 5, as *resupinatus*, *caninus*, &c.; nine species in Germany.

3. *Umbilicaria*. Frond leafy, peltate. Shields contorted.—Ten species. The umbilicated Lichens, sect. 6; *Gyrophora* of Acharius.

4. *Cladonia*. Frond caulescent, cylindrical, hollow. Shields tubercular.—Thirty-seven species.—This genus embraces not only those of the Linnæan *fruticulosa*, sect. 8, to which *rangiferinus* belongs, but likewise all the *scyphoseri* (or *pyxidati*) sect. 7.—Thirty-seven species are described.

5. *Stereocaulon*. Frond caulescent, cylindrical, solid. Shields tubercular, globose.—This is, perhaps, the most exceptional genus, confounding *L. paschalis*, (see LICHEN, sect. 8. n. 111.) along with the powdery-fruited kinds, *globiferus*, *fragilis*, and *compressus*; and with these the coral-crusted tribe, which make the Acharian genus *Idium* hereafter mentioned. Even *L. niger* of Hudson and Linnæus, *Engl. Bot. t. 1161*, perhaps more akin to *Collema*, though its shields have no border, is joined with them. The whole however make but nine species.

6. *Ufnea*. Frond strap-like, or filamentous. Shields radiated or naked.—Equivalent to the *filamentosa*, sect. 9, of Linnæus. Sixteen German species.

7. *Lobaria*. Frond lobed, lacinated, much divided, erect, or depressed. Shields bordered.—This large and rather multifarious genus, comprehending 62 German species, is divided into four sections, which perhaps run so much into each other as to justify the whole assemblage. They are

\* *Platysma*. Frond (mostly) pitted.  
To this belong many of Linnæus's sect. 4, *foliacei*, as the *farinaceus*, *frazineus*, and their allies. To these the *rigidus*, which is *trifidus*, n. 112, of the Linnæan arrangement, is sub-joined. Then follow *islandicus*, &c.; then *furfuraceus*, Linn. n. 53. *Engl. Bot. t. 984*, and *ciliaris*. All these are characterised as having a pitted or cellular frond, which is more or less erect. They are however a very various tribe.—Five species have a pitted depressed frond, as *saxatilis*, and *pulmonarius*, Linn. n. 52. *Engl. Bot. t. 572*.—Twelve are defined as having a dilated frond, in which *saccatus* is included, with *caperatus*, *perlatus*, *parietinus*, and others, which are by no means naturally allied, nor is the character expressive, if it means absolutely that the frond is never pitted, or that it is more dilated than in the preceding ones.

\*\* *Phycia*. Frond inflated, as in *L. physodes*, Linn. n. 44. *Engl. Bot. t. 126*.

## LICHENES.

\*\*\* *Squamaria*. Frond narrowly divided, as in *stellaris*, and its numerous allies.

\*\*\*\* *Placidium*. Frond crustaceous, obscurely imbricated. In the beginning of this section, several species occur which are not really crustaceous, and which are closely akin to *stellaris*, though more depressed. True examples of *Placidium* are *L. javicola*, Engl. Bot. t. 1695; as well as *candicans*, t. 1778; and *gelidus*, Linn. n. 23.

8. *Pfora*. Crust figured. Shields bordered, convex.—Twenty-six German species are enumerated under this genus, many of which are among the imbricated Lichens of Linnæus, others amongst his leprous or crustaceous ones. In all of them the crust is either formed into leaflets, or granulations of a determinate shape, seated on a homogeneous white chalky basis, the outer surface being variously coloured.

9. *Verrucaria*. Crust leaflets, leprous, tartareous. Shields with or without a border.—This genus comprehends most of the leprous Lichens of Linnæus. See LICHEN, sect. 1 and 2. Seventy-one German species are defined, disposed according to the colours of their shields.

Such is the method of Hoffmann, who in his sumptuous and truly excellent work, entitled *Plantæ Lichenosæ*, consisting of three thin folio volumes, with seventy-two fine coloured plates, has described and figured a great number of species from all parts of the world. This book however does not exactly agree in generic distribution with his *Flora Germanica*, but they are easily compared together. The same writer has left unfinished an *Enumeratio Lichenum*, in quarto, begun in 1784, of which we have 102 pages, and 22 uncoloured plates, very finely drawn by the author. In this book *Lichen* stands as one genus, divided into several sections; improperly termed orders.

Professor Acharius, above-mentioned, having previously in several papers, with plates drawn by himself, in the Stockholm Transactions, elucidated various species or tribes of Lichens, published in 1798 his *Lichenographiæ Suevicæ Prodrômus*, in one volume octavo, with coloured figures of five species only. This work marks an era in cryptogamic botany. Though it professes to treat of Swedish Lichens only, it in fact indicates all of which the learned writer could discover any tidings, with their specific characters, synonyms, and places of growth, besides innumerable valuable observations. The whole are ranged under the name of *Lichen*, as one genus, but divided into twenty-eight tribes, or sections, of which the genera of Hoffmann form the basis. These tribes compose three families, under whose subdivisions we shall indicate them all. The peculiar terms which occur will be explained hereafter.

### Family 1. CRUSTACEOUS LICHENS.

Having a crustaceous, more or less expanded, base.

A. Crust irregular, powdery, or in fibrous flakes.

1. *Lepraria*. Receptacles scarcely known.—(Most of these come under the genus *Byssus* in Linnæus.)

B. Crust solid, flattish, uniform, nearly orbicular.

2. *Verrucaria*. Receptacles (*thalami*) hidden in the crust, roundish, concave, opening by a perforation at the top.

3. *Opegrapha*. Clefts (*lirellæ*) closely attached to the crust, and opening longitudinally.

4. *Variolaria*. Powdery little masses (*glomeruli*) attached to the surface of the crust.

5. *Ureolaria*. Shields hollowed, sunk in portions or warts of the surface of the crust.

6. *Patellaria*. Shields attached to the surface of the crust, either concave or flat, with a border, or convex and hemispherical, with scarcely any.

7. *Bæomyces*. Tubercles smooth and even, nearly globose, fungus-like, terminating elevated stalks.

8. *Calicium*. Tubercles stalked, lenticular, opening by a torn border, discovering a powdery elevated disk.

C. Crust unequal, composed of coral-like, crowded little branches.

9. *Isidium*. Tubercles terminal.

D. Crust rather leafy.

10. *Pfœroma*. Crust irregular, covered with minute somewhat imbricated scales. Shields lateral, as well as marginal.

11. *Placidium*. Crust globe-puffed, flat, orbicular, with a lobed permanent margin. Shields lateral.

### Family 2. LEAFY LICHENS.

Without a stem, and consisting of a simple or multiplied, sessile, divided, somewhat membranous leaf.

E. Receptacles scattered, sessile on the leaf.

12. *Imbricaria*. Shields and powdery masses (*glomeruli*) lateral. Leaves membranous, depressed, imbricated, spreading circularly, minutely fibrous underneath.

13. *Collema*. Shields lateral and marginal. Leaves gelatinous.

14. *Endocarpon*. Receptacles (*thalami*) hollow, immersed in the leaf, opening by a prominent mouth. See EXOCARPON.

15. *Umbilicaria*. Receptacles (*trixæ*) convoluted, raised. See GYROPHORA.

16. *Lobaria*. Shields and powdery masses lateral. Leaves somewhat coriaceous, widely spreading, ascending, villous underneath.

17. *Sticta*. Shields scattered; or Targets marginal. Leaves somewhat coriaceous, stamped beneath with little bald pits, amongst down.

18. *Peltidea*. Targets lateral and somewhat marginal, on the front or back of the leaf. Leaves coriaceous, mostly veiny, as well as downy, beneath.

19. *Platyma*. Shields target-like, scattered. Leaves membranous, ascending, crisp, naked on both sides.

20. *Physcia*. Shields scattered. Leaves rather cartilaginous, smooth, tufted, linear and jagged.

F. Receptacles elevated far above the leaves, on the tops of stalks.

21. *Scyphophorus*. Tubercles on hollow stalks, dilated upwards, and closed.

22. *Helopodium*. Tubercles fungous, on nearly solid, simply sub-divided stalks, scarcely dilated upwards.

23. *Cladonia*. Tubercles nearly globose, on taper-pointed, elongated, tubular, branched and shrubby stalks.

### Family 3. CAULESCENT LICHENS.

Stems either solid, branched, round and shrubby, or elongated and thread or strap-like.

G. Shrubby, with solid rigid stems.

24. *Stereocaulon*. Shields globose, solid, scattered.

25. *Sphaerophorus*. Cellules terminal, finally bursting.

26. *Cornicularia*. Shields radiated, at length rather convex, terminal.

H. Filamentous, elongated.

27. *Selaria*. Shields and powdery masses lateral. Branches naked, smooth and contiguous.

28. *Ufnea*. Shields flat and radiated, or convex and slightly bordered, scattered; as well as powdery masses. Branches with a crustaceous, somewhat jointed, coat.

It will easily be seen, by comparison, how far these sections answer to Hoffmann's genera. The first five have nothing corresponding with them. *Patellaria* is equivalent to his

## LICHENES.

*Verrucaria*, at least in idea. *Beomyces*, *Scyphophorus*, *Helopodium*, and *Cladonia*, are included in his *Cladonia*. *Pforoma* and *Placodium* are his *Pfora*. *Collema*, *Peltidea*, (his *Peltigera*), *Umbilicaria*, and *Usnea*, agree with his. *Calcium*, *Isidium*, *Endocarpon*, *Sticta*, *Sphaerophorus*, and *Cornicularia*, are not found in his system, except that *Sphaerophorus* is, in his *Pl. Lieb.*, called *Coralloids*. *Imbricaria*, *Lobaria*, *Platisma*, and *Physcia* are nearly comprehended under his *Lobaria*.

It is to be remarked that, in his generic characters, Hoffmann takes the habit into consideration. To this perhaps Acharius, as a philosophical Linnæan, had objections, which induced him to consider these different assemblages of species rather as sections of one great natural genus, the fructification being still much in the dark. In 1803 however he published his *Methodus*, in 8vo. with eight coloured plates, and, soon after, a supplement. In this new work, still keeping the Linnæan principle in view, he aimed at distinguishing the *Lichenes*, as a natural order, into several genera, by the fructification alone. Before we detail these, it is necessary to take a view of the physiology of the order, as explained in his able preface, as well as of his technical terms. Both these subjects are treated also in the preface to his *Prodromus*; but it is best to consider here his latter view of them only, and they are so united together, that an explanation of the terms will sufficiently elucidate the physiological ideas of the author.

*Thallus* is used by Acharius for the whole plant, or herbage, of a *Lichen*, the *frons* of Linnæus (see *FROND*); distinct from every thing belonging to the fructification. It is root, stem, stalk, and leaf, all in one, its substance seeming to assume the nature of either, according to circumstances; but this is, in some measure, the case with every vegetable body, and by no means peculiar to a *Thallus* or *Fronde*. Acharius is unwilling to use the latter word for a mere shapeless crust or mass of powder; but we confess ourselves unable to discover any use, or indeed any distinct meaning, in the new term, unless it were restricted to such crust or powder. Its meaning moreover, *θαλάσσιος*, a *green bough*, is precisely equivalent to *frons*; but this objection is not material.—Of the different forms and textures of this part, we have sufficiently spoken under the article *LICHEN*. It is an essential part, though sometimes nearly or quite destroyed by age, though the fructification may still, for a while, remain.

*Apothecium* (*αποθήκη*, a *receptacle*), is the *receptaculum* of Linnæus, the part where the seeds are formed and brought to maturity. Acharius defines it as “bearing, encompassing, or containing the organs subservient to the propagation of Lichens; distinct in figure, generally in colour and nature, from the *thallus*, or frond, on which it is situated, and which sometimes furnishes it with an exterior covering.” The fecundation having taken place, in some manner unknown to us, within the frond, these receptacles, (as we must still beg leave to call them,) gradually increase, and finally expose their internal part, which is either occupied by a fibrous texture, more or less dense, or is, when moist, in some measure gelatinous, rarely appearing hollow. Their shape is most frequently roundish, but otherwise very various, as has been already explained. (See *LICHEN*, sect. 1.) When ripe they discharge their seeds, either naked, or contained in cases. Sometimes, though rarely, their under-side produces naked seeds. To the various situations of these receptacles, the generic characters already explained have sufficiently alluded; their various kinds have also been mentioned, but will now be more fully described. Hedwig and Gärtner differ about the seeds of Lichens; the latter supposing them (for it is entirely supposition) to be rather of the

nature of buds or offsets, which he terms *propagines*, and not actual seeds produced by sexual impregnation. The reason for this opinion seems to be, that the mode of such impregnation has not been discovered, any more than in ferns or sea-weeds.

Acharius defines thirteen sorts of receptacle, or *apothecium*.

1. *Scutella*, shields. These are open, orbicular, compared by Dillenius to a saucer; their border, and under-side, of the substance, and usually of the colour of the crust, or leaf. Their disk, (*stratum proliferum* of Acharius) almost always differing in colour, and totally distinct in substance from the margin, contains the seeds in the vertical parallel cells of its internal substance. Their border is termed an *accessory*, not a *proper*, one. The shields are either thick, tumid, entirely sessile, or even funk, as in many crustaceous Lichens; or membranous, often elevated, somewhat stalked; very rarely they become perforated in the centre.

2. *Patellula*. Spangles. (See Dillenius, p. 133.) Open and orbicular, like shields, but sessile, and by no means formed of any part of the crust, from which they differ in colour, being most usually black. The seeds are lodged beneath the membrane that covers their disk, as in the former; and the disk is surrounded by a *proper* border, that is, of its own substance and colour. Their seeds are observed to be naked in the cellular substance of the disk, not inclosed in cases. The figure of the *patellula* is not liable to much variation, except that the disk is sometimes concave, sometimes flat, but more frequently convex, and in an advanced state often globose, so that the border disappears. This kind of receptacle is properly that of the *leprosus tuberculatus* Lichens of Linnæus, and belongs to the genus *Lecidea* of Acharius.

3. *Cypbella*. Pits. Open cup-like little naked, white or yellow spots, on the under, generally downy, side of the leaf, in the Acharian genus *Sticta*; see Engl. Bot. t. 2298, 2359. They are at first minute dots, globose, and immersed in the substance of the leaf; at length they burst, with an irregular margin, and discharge a powder, which Acharius, who has first defined and named them, supposed to be of “a spermatic nature;” by which we presume he means of the nature of pollen.

4. *Lirella*. Clefs. Open, elongated, sessile, black receptacles, with a somewhat spongy, very narrow, or quite linear disk, and a proper border, parallel to it on each side. Sometimes there is an accessory border from the crust besides. This is the peculiar fructification of the genus *Opegrapha* of Perfoon; see Engl. Bot. v. 25 and 26 especially. The *lirella* are either simple and solitary, or aggregate, confluent, and branched. These differences often occur in the same species. *L. scriptus* of Linnæus is a specimen of the genus.

5. *Pilidia*. (*πιδίον*, a little cap or hat.) Puffs.—Little round bordered knobs, whose disk, at first covered with a membrane, and often clothed with fine grey hoariness, finally turns to powder. They are elongated below into a stalk, fixed to the crust, but totally different from it. *Calcium* of Perfoon has this sort of fructification.

6. *Orbilla*. Orbs. Flat, orbicular and dilated, of the substance of the frond, terminal, peltate, without a border, but often surrounded with radiating shoots. The membrane, or disk, under which the seeds are lodged, is smooth, mostly of the colour of the frond. These are seen in the filamentous Lichens, or *Usnea*. Spurious *orbilla*, bordered like shields or spangles when young, are found in some *Cornicularia* of Acharius.

If *orbilla* produce real seeds, the filamentous Lichens have two kinds of fruit, for they bear also proper tubercles, or rather

rather *cephalodia*; see n. 12. But we cannot easily assent to this; see *Ufnea* hereafter.

7. *Pelva*. Targets. Flat, closely pressed, and attached by their whole under-side, as if glued, to the frond, sometimes at its back. They are broad, kidney-shaped or oblong, rarely irregular, covered with a thin coloured disk, with no border, except occasionally a very minute accessory one, which seems to circumscribe them. In an early stage they are concave, and concealed by a thin gelatinous fugacious membrane, or veil. (See LICHEN, sect. 5.)—The genus *Cetraria* is thought by Acharius to have spurious *pelva*, with a more evident border, entire, crenate or lobed, which is unconnected with the frond beneath, though the greater part of the receptacle is closely attached thereto, and sometimes sunk into its substance.

8. *Trica*. Buttons; (*Dill.*)—Roundish, sessile, unexpanding receptacles, of a peculiar, compact, black, solid substance, continued along their whole surface. Their upper side is distinguished by concentric or plaited and twisted folds, covered by one common membrane through all their convolutions, and lodging in their inside naked seeds, destitute of cases, or cells. See *Gyrophora*, to which these buttons are peculiar.—Sometimes the presence of but one marginal fold gives this kind of receptacle the appearance of a *patellula*, see n. 2; but others will usually be found with more, on the same plant, even in *Gyrophora pusillata*, Engl. Bot. t. 1283.

9. *Thalamia*. Hollows.—Spherical, nearly closed receptacles, lodged in the substance of the frond, lined with a proper coat, under which, in their spongy texture, are cells, each containing from two to four seeds. Each hollow finally opens by an orifice in the surface of the frond above, which sometimes supplies it with a spurious border. These are the proper receptacles of *Endocarpon*; see that article.

10. *Tubercula*. Tubercles.—Spherical, or slightly conical, nearly closed, crustaceous, black, more or less immersed in the surface of the crustaceous frond, or *thallus*, which they elevate; or sometimes they are exposed, being merely sessile. Each contains a ball or mass of connected seeds, destitute of cells, but enveloped in one common membrane, and the whole are finally discharged together by an orifice at the top of the tubercle. Such is the fruit of *Verrucaria*, and if this account be correct, that genus is certainly as distinct in fructification as in habit from *Endocarpon*. The nature of these minute parts is very hard to determine, especially as the tubercles of *Verrucaria* often come under our inspection after they are emptied of their contents.

It must be remembered that Acharius here uses the term tubercle in a restricted sense, and not with that latitude habitual to Linnæus and his followers, amongst whom it commonly, when applied to Lichens, means almost any thing that is not a *field*.

11. *Cistule*. Cellules.—Globose terminal receptacles, formed out of the substance of the frond, filled with uncoated seeds intermixed with fibres, and at length bursting irregularly; as in *Sphaerophoron*. See LICHEN, sect. 8.

12. *Cephalodia*. Knobs.—Convex, or more or less globular, covered externally with a coloured seed-bearing crust, and placed generally at the extremities of stalks originating from the frond (being rarely sessile and scattered as in *Stereocaulon*), permanent. Such are seen in *Baomyces*, or the Cup-bearing Lichens. (See LICHEN, sect. 7.) In some of the filamentous tribe, *Ufnea*, they are at first like *patellula*, and sessile, becoming afterwards convex and irregular. See *orbille*, n. 6.—*Cephalodia* are sometimes simple, sometimes compound or conglomerated.

13. *Globuli*. Globules.—Globose, solid and crustaceous, formed of the substance of the frond, and terminating its points or branches, from whence they fall off entire, leaving a pit or cavity. They are supposed to be covered all over with a coloured seed-bearing membrane, and are taken for one of the modes of fructification in the *Isidium* of Acharius; see hereafter.

Acharius explains as follows certain terms used in his descriptions of Lichens.

*Theca* are the cases or cells containing the seeds, in the disk of most receptacles, at least in *scutelle*.

*Spore* are the seeds, of whose nature very little is known. This author declines calling them *femina*, because they are presumed to have no cotyledons; but that is no sufficient reason. The question is, whether they are produced by sexual impregnation; if not, they are *gemma* (buds or offshoots). We need not here repeat what is said under the article *GEMMA*.

*Propagula* are those little roundish deciduous bodies, commonly termed *powder* in speaking of these plants, but which may be called the *efflorescence*. These bodies are either dispersed or clustered on the surface of the frond, and each of them is asserted by Schreber to be a hollow vesicle, and by Hoffmann to discharge, through an orifice, a quantity of fine dust. They are also not unfrequently powdery at their outside; sometimes interwoven with very short and slender threads, and finally pass into what is supposed by Acharius to be an assemblage of minute buds, *gemma*.

Acharius observes, that "some have taken these bodies for pollen, or male flowers; but that this conjecture is utterly contrary to the observations of Micheli and Schmidt, who saw them germinate, and produce offspring." Schmidt's remarks we have not seen, but Micheli certainly asserts, in his *Nova Plantarum Genera*, 74, t. 41, Q, R, that he saw this powdery matter germinate, and produce plants, in the cup-bearing tribe of Lichens. He therefore takes the shields and their contents, which he has delineated in his t. 52, for male blossoms, and this opinion was adopted by Linnæus. Hedwig nevertheless, in his *Theoria*, p. 120, strongly combats this doctrine, asserting that Micheli might easily be mistaken, as the real seeds, visible only with a very high magnifier, would escape observation, when fallen among the powder, and vegetating there, would cause the young plants to seem the offspring of the latter. Gærtner thinks the powder is of the nature of buds; but his opinion is equally theoretical with that of Adanson, who takes the contents of the shields for seeds. Acharius adopts both these opinions, and offers an ingenious conjecture of his own, which is, that the powdery buds may be destined to produce individual plants that propagate themselves subsequently by the same mode; while the seeds of the shields or tubercles may produce complete fructifying plants, which go on to increase by seed. Hence, his genus *Lepraria*, as he presumes, propagates itself by the former means, without any other. We confess this genus is very puzzling; but when so conspicuous a plant as *Lemna* has so long flowered and fruited without observation, and supposed *Lepraria* are from time to time detected with fields, we are disposed to attribute much to our ignorance. We certainly cannot agree with Dr. Acharius when he goes so far as to suggest that the seeds, which originate from the shields, may sometimes produce shields alone without any frond! The latter is well known to be now and then fugacious, and so is invariably the root of *Cuscuta*, though absolutely essential to the young plant. It is very desirable that some person should see the germination of the seeds of Lichens, taken from the fields; though there seems little reason to doubt

their being such, whatever the powdery masses or warts may be. We are chiefly led by the observation of Hoffmann, above-mentioned, to persist in the opinion of Hedwig. If the powdery granules in question be really vascular, and emit a dust, it is so analogous to the anthers of all other known plants, and so unlike the nature of *gemmae*, that, if the contents of the shields can be proved to be seeds, of which indeed we have no doubt, there would be little reason to hesitate respecting the others. We do not mean that every granular appearance about the fronds of Lichens must be anthers. Much of it, doubtless, is gemmaceous, but anthers may accompany it; and the latter may in *Lepraria* impregnate minute or solitary seeds, that also accompany the granules, and that have hitherto escaped detection.

*Soredia* are assemblages of the above powdery bodies, collected on a sort of receptacle. This Acharius exemplifies by *Variolaria*, as will be mentioned in speaking of that genus. Some *soredia* originate from cracks in the frond.

*Pulvinuli* are excrescences found occasionally on the surface of the frond, often clustered or branched, whose use and nature are unknown. They occur in *Gyrophora pustulata*; but are most remarkable in *Lichen glomuliferus* of Lightfoot. See Engl. Bot. t. 293.

*Verrucae* are variously-shaped protuberances, solid, and usually smooth, originating from the crust, and sometimes, though rarely, bearing or lodging the fructification, as in *Lichen pertusus* of Linnæus. See Engl. Bot. t. 677; also t. 2317. 2336.

*Podetia* are stalks elevating the fruit, as in the Cup Lichens, and are either solid or hollow.

*Lorulae* are the long thread-like branches of the *Ufnea* tribe.

We are now to take a compendious view of the genera of the Lichenes, as defined in the *Methodus* of Acharius, upon principles dependent on the parts of fructification, or, at least, propagation. These genera are 23, disposed in three sections.

SECT. I. STEREOTHALAMI; (from *στερω*, to deprive, and *θαλαμος*, a bed.)

Receptacle none. Organs of propagation naked, scattered or aggregate.

1. *Pulveraria*. Efflorescence powdery, collected into tufts by fine, slender, interwoven threads. (Frond none.)

This genus is now reduced by its author to the following. See *Lepraria chlorina*, Engl. Bot. t. 2038, a most beautiful production, which covers rocks with a coat many inches, or some feet, broad, resembling bright lemon-coloured cloth or velvet.

2. *Lepraria*. Efflorescence somewhat globular, scattered loose over a crustaceous base, which it often entirely covers superficially. (Frond crustaceous, indeterminate.)

This, like *Pulveraria*, comes under the *Elysius* of Linnæus, who has described some species of it. The most common is *L. botryoides*, Ach. n. 7. Engl. Bot. t. 2148, seen every where on the trunks of trees, and on posts, to which it gives a green colour in winter. Another very common species, *incana*, n. 2, has been found with *patellulae*, which make it a *Lecidea* of Acharius. See Engl. Bot. t. 1683; as has his *lephæma*, n. 3, which is his *Lecidea* (or rather *Parmelia*) *Stonæ*; Meth. 65; *Lichen Hæmatomma*; Engl. Bot. t. 486. *Lepraria rubens*, n. 6, is *Conferva lichænicola*; Engl. Bot. t. 1609; and probably Michel's *Lichen crustaceus, arboribus adnascens, tenuissimus, pulverulentus, ruber*; Nov. Gen. 100. n. 73.

Wiggers, or rather Weber (see the beginning of this article), places this genus (under the name *Lepra*, by which

Haller had previously distinguished it), in his order of *Asperma*, defined as "defluite of fructification." But many of the plants, which he refers to that order, are now known to have seeds, and his genera are liable otherwise to much exception.

3. *Spiloma*. Efflorescence? in shapeless, superficial masses, woolly and powdery, rigid. (Frond crustaceous, indeterminate, thin, uniform.)—Of this genus several species may be seen in Engl. Bot. v. 29 and 30. Notwithstanding the above character, the crust may be seen to be determinate, or limited, in Engl. Bot. t. 2150, where it has a very distinct and curious border.

4. *Variolaria*. Efflorescence globose, collected in distinct assemblages (*soredia*). (Frond crustaceous, mostly determinate.)—Great light has been thrown upon this genus since the publication of the *Methodus* of Acharius. See Turner Tr. of Linn. Soc. v. 9. 137—140, and Engl. Bot. v. 28. t. 2008; v. 29. t. 2061; so that it is now removed by Acharius himself to the second section of his *Lichenes*, as having true receptacles. It seems indeed, in our opinion, to give no small support to the theory of the powdery efflorescence (*propagula*), above-described, being the male part of the fructification. *Variolaria* has true receptacles, seated on a thick tartareous crust, which supplies them with an accessory border, of more or less thickness or regularity. Their disk, or space within the border, is occupied with an assemblage of the powdery substance in question, of which so much has already been said, and under which has been observed, in several species, a coloured fleshy or waxy disk, lodging seeds (as we all presume them to be) in vertical cells; like a true shield. Here then the two sexes seem united in one receptacle. In some cases the male is most abundant and predominant, and the waxy disk is scarcely discernible; at least at that period of growth when such specimens have happened to come under examination, which is when the powdery substance renders them most obvious; but it is most likely, from analogy of other plants, that the disk may subsequently increase. In other instances, as in *Lichen multipunctus*, Engl. Bot. t. 2061, the powder is in less proportion, sooner almost disappears, and the disk is very evident beneath it. Some traces of a disk may be found, in what we would term the flowering state of the original *Variolaria faginea*. See Engl. Bot. t. 1713.—The Hedwigian theory of the impregnation of Lichenes appears to us greatly confirmed by these observations, and we cannot but think that the opinion of the germination of their powdery efflorescence has been too hastily admitted by recent naturalists.

SECT. 2. IDIOTHALAMI; (from *ιδιος*, proper, and *θαλαμος*.)

Receptacle composed of a peculiar compact hardish substance, not in any manner formed out of the frond, from which it differs in colour (being mostly black).

The seeds are naked, not enclosed in proper cells, except in *Endocarpon*; upon which we shall offer some remarks hereafter.

\* *Receptacles open.*

5. *Opegrapha*. Clefts black, sessile, oblong or linear, simple, confluent, or branched, straight or zigzag, bordered; their disk flat or slightly concave, naked or powdery, narrow, linear, rarely dilated; their border (of their own substance) often very narrow and scarcely perceptible, sometimes tumid, elevated, and somewhat inflexed. Sometimes there is a spurious accessory border, or mere swelling of the crust. (Frond crustaceous, uniform, thin, generally indeterminate; occasionally leprous.)

*Lichen scriptus* of Linnæus, with about thirty known species

cies besides, compose this genus. See Engl. Bot. v. 25, 26. 32, &c.

5\*. *Acharia*. Achar. in Schrad. N. Journ. v. 1. fasc. 3. t. 5. 3. Receptacles flattish, shapeless, smooth, without a border, sessile.

We introduce this, as described by the author since the publication of his *Methodus*. A genuine example of it is *A. Swartziana*, see as above, p. 13. t. 4. f. 1. Engl. Bot. t. 2079. We conceive several plants are improperly referred to this genus by Acharius, as *Spilona vesiculosor*, Engl. Bot. t. 2076, and *Opegrapha asporoides*, Ach. Meth. 25. Engl. Bot. t. 1847; to lay nothing of *Lichen croc.* t. 498, and *saccatus*, t. 288; whose shields or targets have no irregularity of shape, and whose fronds are of so totally different nature from the crust of *A. Swartziana*. In short, we can scarcely find another certain species to associate with this; except possibly *A. gyrosa*, Ach. as above, p. 14. t. 4. f. 3.

6. *Lecidea*. Spangles sessile, with a flattish or convex disk. (FronD various; crustaceous, whether uniform and limited, or scattered and indeterminate; or even leafy, somewhat membranous, or flattened. Acharius adds "rarely umbilicated;" from an idea now proved erroneous, that *Gyrophora pustulata* was a *Lecidea*.) See GYROPHORA.

This is an extensive genus, excellent as far as only crustaceous species are admitted, such being the genuine *Lichenes leprosi tuberculati* of Linnæus. See LICHEN, section the 1st; and the term *patellula* in the present article.—These constitute the first section named *cailliraria*, comprising 80 species, 45 of which have black or bluish receptacles, the rest red, yellow, or brownish.—The second section, *lepidoma*, has a figured or lobed crust, often imbricated, and embraces 14 species, among which are *Lichen niger*, Engl. Bot. t. 1161, and *deciptens*, t. 870.—The third is a small section, with a leafy crust, *sapbenaria*, into which should be admitted *Lichen dedaleus*, Engl. Bot. t. 2129.—The fourth, *omphalaria*, contains only *Gyrophora pustulata*, with its near relation *penlywanica*, and ought to be abolished.

7. *Calcium*. Puffs (*psilidia*) turbinate, lenticular, or nearly globose. They are generally elevated on a rigid simple stalk, of a totally different substance from the crust. (FronD crustaceous, either leprous, or tartareous, uniform or scattered, powdery and granulated, or solid and chequered, or somewhat leafy and imbricated; see *Lichen phaeocephalus*, Turn. Tr. of Linn. Soc. v. 8. 260. t. 6.) Acharius describes 18 species, to which several have since been added by discoveries in Lapland and England. They are minute productions, long confounded with *fungi*, from which they were first distinguished by Perfoon on account of their crust. It must be acknowledged that they bear the same analogy to several genera of *fungi*, that other Lichens, with proper shields, do to others, the *Oëospore* of Hedwig. Examples of *Calcium* are seen in Engl. Bot. t. 1465; 1539; 1540. 1832. &c.

\* Receptacles closed, at length opening.

8. *Gyrophora*. Buttons (*trica*) superficial, flattish. (FronD leafy, peltate, between membranous and leathery.) See GYROPHORA, in its proper place.

9. *Bathelium*. Receptacles sessile, somewhat globose, opening by a deciduous lid, hollow, of one to three cells, lined with seeds. (FronD crustaceous, indeterminate, uniform.) This genus consists of only *B. majloideum*, Ach. Meth. 111. t. 8. f. 3, found on the bark of trees at Sierra Leone by Dr. Azelius.

10. *Verrucaria*. Tubercles elevated, discharging their concatenated seeds by a terminal pore, or else falling out entire. (FronD thin crustaceous, uniform.)

A minute tribe, of which about 40 species are known. See *Lichen Schraderi*, Engl. Bot. t. 1711; and *analeptus*, t. 1848.

11. *Endocarpon*. Hollows (*thalamia*) hidden in the substance of the frond, each opening by a little mouth. Seeds enclosed in cells. (FronD membranous, somewhat crustaceous, of a determinate figure.) See ENDOCARPON in its proper place.

As the seeds are certainly enclosed in cells, like the genera of the next section, it seems desirable to range this genus with them. We are moreover now well aware that it differs sufficiently from *Verrucaria* in having parallel cells, lodged in a disk lining the cavity of the receptacle; whereas, in that, the concatenated naked seeds, clustered into a ball, fill the cavity. Their habits indeed are also totally unlike.

The receptacles of *Endocarpon* are, moreover, so united to the substance of the frond, that they may perhaps be considered as belonging to it, though somewhat different in colour; see Hedw. Crypt. v. 2. t. 20, A.

SECT. 3. CENOTIALAMI; (from *κενος*, common or general, and *θηλαμος*.)

Receptacle formed of the frond itself, with which it agrees in substance and colour. Seeds enclosed in proper cells, except in *Sphaeroboron*.

\* Receptacles compound, either pierced or gaping.

12. *Thelotrema*. Receptacle compound; the outer one wart-like, elevated, of the substance of the crust; inner somewhat globular, with a concave disk. (FronD a firm, continued, indeterminate crust.)—Examples are *Lichen pertusus*, Linn. Mant. 131. Engl. Bot. t. 677; and *L. inclusus*, t. 678. Acharius seems to have had the former in view when he defined the receptacles as "compound and opening by several little mouths." They are, in that species, generally aggregate or confluent, but each is internally distinct; and in others they are usually as distinct and separate as the shields of any other Lichen.

\* Receptacles nearly globular, closed, at length bursting.

13. *Sphaeroboron*. Cellules nearly globose, each enclosing a roundish ball of naked compact seeds, which turns to black powder, and is discharged by the torn orifice, leaving the cellule hollow and empty. (FronD shrubby, branched, solid, rigid; tartareous or minutely fibrous within; with a smooth cartilaginous coat.)—This elegant genus is exemplified by *Lichen globiferus*, Engl. Bot. t. 115; and *frogillus*, t. 114; which, with the real *fragilis* of Linnæus, make up the list of known species; see LICHEN, sect. 8 *fruticulosi*.

14. *Isidium*. Receptacle of the seeds terminal, somewhat discoid, solid, various in thickness, covered with, and shining through, the crust of the *papille* of the frond, which at length bursts, and each receptacle appears coloured, and partly exposed. *Globules* also either terminate each of the *papille*, or are nearly sessile on the crust itself. These are coloured, and finally fall out, each leaving a little pit at the summit of the *papilla* or branch. The globule is internally solid, and both sides are covered with a seed-bearing coat. (FronD crustaceous, leprous and tartareous, cracked, rather indeterminate, either papillary only, or throwing up solid branches.)

Such is, as precisely as we can give it, the character of *Isidium*, a genus founded by Acharius. He allows in a note that this genus is doubtful and ambiguous, nearest to *Sphaeroboron*, but differing in having a properly crustaceous frond, or basis, and especially in the nature of its *stratum proligerum*, (disk, or receptacle of the seeds,) which does not turn to dust; as well as in the presence of terminal *globules* (see the explanation of this term, n. 13, among the kinds of receptacles,) even when the other receptacles are wanting.

## LICHENES.

wanting. He adds that this double sort of fruit in *Isidium* demands further enquiry, for he is firmly persuaded that these globules belong to the organs of fructification.—We presume that *Lichen oculatus*, Engl. Bot. t. 1833, (see *Stereocaulon* hereafter) exhibits the former kind of receptacle, and *L. Weylingii*, t. 2204, the latter; but of this we have no certain knowledge.—*Isidium gonatodes* of Acharius appears by his *Supplementum* to be a mere variety of the crust of *L. tartareus* of Linnæus.

\*\*\* Receptacles orbicular, open; their border of the colour of the frond, surrounding a variously-coloured disk.

15. *Urecolaria*. Shields or spangles cup-shaped, variously coloured, sunk into the substance of the crust, or of its fragments or warts. Disk concave, rarely becoming flattish by age, but never elevated above the crust. Proper border often scarcely manifest, of the colour of the disk; the accessory one sometimes formed of the crust, which is elevated like a ring, surrounding the disk of each shield; but it is generally spurious, not united to the shield throughout. (Frond crustaceous, tartareous, uniform, determinate, checked or cracked, rarely figured or lobate.)—Examples of this genus are the common *Lichen scruposus*, Engl. Bot. t. 266; the rare *exanthematicus*, t. 1184. Tr. of Linn. Soc. v. 1. t. 4. f. 1; and *Urecolaria calcarea*, Ach. Meth. 142, very common on grey marble tombstones, in exposed country churchyards, where it forms inseparable hard white patches, two or three feet broad. This last is *Zatellaria multipunctata*, Hoffm. Pl. Lieb. t. 63. f. 1—3; *Lichen cinereus*, Engl. Bot. t. 820, but not that of Linnæus. It is erroneously made a *Parmelia* in Ach. Meth. 158.

16. *Parmelia*. Shields superficial, or elevated, thick or somewhat membranous, flattish, convex, or concave, crowned with a free accessory border. (FronD various, crustaceous, leafy, branched or lacinated, cartilaginous, membranous or gelatinous.) This vast and various genus swallows up the greater part of the natural order; *Lecidea*, n. 6, being far inferior to it in number of species, though greatly superior as a natural and consistent genus. 204 *Parmelia* are defined in the *Methodus*, besides several in the *Supplementum* of Acharius. This author is often in doubt to which genus some species belong, for want of knowing them in every state of growth. The true *Parmelia* have an accessory border of the colour and substance of their crust, but no proper border formed of the substance of the disk. The sections of this genus are eleven, distinguished by the nature of their frond, the first three being crustaceous, as in *Lichen tartareus* (see LICHEN, sect. 2.); the two next are leafy, more or less depressed. The sixth section consists of Hoffmann's *Collema*, (see the early part of the present article,) and has been lately restored to the rank of a genus in Engl. Bot. t. 2284, with this character. "Shields orbicular, horizontal, nearly sessile, superficial, with a gelatinous accessory border." The five remaining sections are the most miscellaneous possible, nearly as much so as the original genus *Lichen* in Linnæus.

\*\*\*\* Receptacles flattened, nearly destitute of a border; their upper side entirely covered with a thin seed-bearing disk, of considerable solidity at the surface.

17. *Stictia*. Shields on the upper side of the frond, sessile, close-pressed, orbicular, membranaceous; their disk flat, rarely somewhat convex; their border accessory, thin, entire, free, slightly tumid, rarely fringed, of the colour of the frond. Pits amongst the down of the under side, scattered, sessile, minute, coloured; their disk roundish, powdery; border elevated, a little inflexed, entire or jagged, sometimes obliterated. (FronD leafy, membranous or in

some measure coriaceous, lobed or jagged, downy or shaggy beneath.)

A beautiful and natural genus, of which the pits (*cyphellæ*) at the back of the frond form the most essential character. Acharius seems to have admitted them as a part of the fructification. If so, they should seem to be the male blossoms. The species of this genus, however, often abound with powdery efflorescence. See *Lichen limbatas*, Engl. Bot. t. 1104; also *Sylvaticus*, t. 2298; *erocatus*, t. 2110; and *curvatus*, t. 2359. Acharius has fourteen species in all, several of them extra-european.

18. *Pelidea*. Targets closely attached to the frond, about the margin, on the upper or under side, rarely lateral, or towards the middle, each entirely consisting of a flattish, very rarely concave, coloured disk; border accessory, very thin and scarcely discernible, united with the frond, and of the same colour. (FronD leafy, rather leathery; with downy veins and fibres beneath, rarely naked; the circumference lobed, its barren lobes depressed, fertile ones elongated, ascending, naked at the back.)

One of the most natural genera, the *Peligeria* of Hoffmann; most allied to *Stictia* in habit, but wanting the *cyphellæ*, instead of which the prominent veins or ribs underneath are remarkable.—See *Lichen caninus*, Engl. Bot. t. 2299; *rufifens*, t. 2300; and the more rare *venosus*, t. 887; *aphthosus*, t. 1110; and *colinus*, t. 1834; which last Dr. Acharius now admits as distinct from *rufifens*, and the same plant with his *P. lidia* *scutata*. He also informs us that his *P. chlorophylla*, n. 7, is no other than his *Cetraria spinicula* &c. For mention of other species, see LICHEN, sect. 5.—*Lichen crceus*, Engl. Bot. t. 498; and *saccatus*, t. 288, seem to us much better placed in this genus, as in Ach. Meth. 290, than in *Arthonia* above-mentioned.

19. *Cetraria*. Targets shield-like, thickish, flat, close-pressed, sessile, near the margin; their circumference loose, rounded, deformed or wavy; disk coloured, slightly convex; border accessory, very narrow, entire or crenate, of the colour of the frond. (FronD leafy, membranous or somewhat cartilaginous, rigid, smooth and naked on both sides; sometimes cellular or pitted; lobed and jagged, often crisped at the edges.)

The receptacles of this genus are, as it were, of an intermediate kind between shields and targets, rather most akin to the latter. The nature of the frond however, its smoothness, polish, and membranous, somewhat rigid, texture, render *Cetraria* very distinct, on the score of habit, from the last. But eight or nine species are described; among which are *Lichen islandicus*, Linn. n. 50. Engl. Bot. t. 1330; *oculatus*, Sm. Tr. of Linn. Soc. v. 1. 84. t. 4. f. 7; *glucosus*, Linn. n. 67. Engl. Bot. t. 1606. See LICHEN, sect. 4.

20. *Cornicularia*. Orbs shield-like, terminal, peltate, thickish, cartilaginous, orbicular, flat; at length rather convex, uneven, and irregular; disk generally of the colour of the frond; border scarcely any, except in a young state, a slight accessory one, entire, naked, or radiated, at length reflexed. (FronD cartilaginous, rigid, smooth, rather solid, spongy within, of a shrubby, tufted, branched habit, the branches acute.)—This genus is about as numerous in species as the last. It is conceived by Acharius to be intermediate betwixt *Parmelia* and *Uynea*, approaching the former most in the frond, the latter in the fruit, except that the occasionally deeper colour of the disk, and the presence of an early border, betray more affinity to the latter.—Examples of *Cornicularia* are, *Lichen trifidus*

Weber, Linn. n. 112, described in Engl. Bot. t. 720; and *lupuloides*, t. 452; which last is *C. spadicosa* of Acharius; also *L. bicolor*, Engl. Bot. t. 1853, which has lately been shown by the Rev. H. Davies to be the *Ufnea lana nigra infula saxis adhaerens*; Dill. Musc. 66. t. 13. f. 8, a long-disputed and uncertain plant; t. 13. f. 9. being *L. lanatus*, Engl. Bot. t. 846.

21. *Ufnea*. Orbs somewhat coriaceous, flattened, pel-tate, naked and smooth on both sides, mollly very much dilated; disk first concave, then flat, even; subsequently rather convex and cracked, or warty, scarcely convex; border either none at all, or an accessory one, which is entire or toothed in the circumference, very often radiated. Knobs (*cephalodia*) on the same, or a different plant, sessile, lateral, scattered; at first shield-like, and sometimes, in a manner, bordered; finally convex and warty, coloured.

This apparently double mode of fructification in the *Ufnea*, or proper filamentous Lichens, see LICHEN, sect. the last, involves as great a mystery as the *propagula* and seeds. Experiments are requisite to determine whether the *orbilla* produce seeds, as well as the *cephalodia*. Till this is proved, we cannot but feel persuaded that the former are more probably the male blossoms; or possibly they may be abortive or imperfect female ones. Being much the most frequent and conspicuous of the two, and greatly resembling shields, they have been of course taken for the fruit, the *cephalodia* having nearly escaped observation, till lately; see Sm. Tour on the Continent, ed. 2. v. 1. 335, and Engl. Bot. t. 872.—(The frond of *Ufnea* is branched, with elongated, cylindrical, three-angled shoots, either nearly erect, prostrate or pendulous, beset with small fibres, and tapering towards the extremities; their coat crustaceous, more or less distinctly jointed like a necklace, and roughish, having a central or medullary thread, which is semipellucid and elastic.)

There can be little doubt of the natural distinctness of the present genus, though some *Parmelias*, (as *L. divaricatus* of Linnaeus), greatly resemble it in general aspect. The jointed frond is very curious, and we believe essential. See examples of *Ufnea* in *Lichen floridus*, Engl. Bot. t. 872; *hirtus*, t. 1354; *plicatus*, t. 257; and *articulatus*, t. 258. Many species referred by Hoffmann and others to the same genus, as *L. divaricatus*; and *subulatus*, Engl. Bot. t. 1880; make a section in the *Parmelia* of Acharius, called *tricharia*.—If the knobs be the true female fructification, *Ufnea* rather belongs to the following section.

\*\*\*\* Receptacles convex, more or less globose, clothed with a seed-bearing layer, or disk, sessile either on the branches, papillary processes, or petiolar stalks, of the frond, terminal and permanent.

22. *Stereocaulon*. Knobs somewhat turbinate; at first furnished with a proper border; then globose, without stalks, simple or clustered, coloured, permanent; disk at first flat and small, but gradually occupying the whole; border of the same uninterrupted substance and colour, entire, at length obliterated. (Frond solid, almost woody, caulescent, erect, branched, mostly clothed with scales, rough and fibrous.)

This genus is more restricted than the *Stereocaulon* of Hoffmann, yet not much more certain or definite. Its proper type is *Lichen paschalis*, Engl. Bot. t. 252. Many others are doubtful. We can scarcely distinguish *S. tabulare*, Ach. Meth. 316. t. 7. f. 3, from *Lichen oculatus* of Dickson, Engl. Bot. t. 1833, *Isidium* & *oculatus* of Acharius.

23. *Beomyces*. Knobs capitate, nearly globose, with reflexed, scarcely bordered, edges, terminating their own proper fruit-stalks, simple or clustered, coloured, permanent;

disk properly none, the whole globose surface being covered with the thin, solid, seed-bearing coat; border none. (Frond either somewhat crustaceous, foetish, granulated, indeterminate, rarely figured; or consisting of a cartilaginous, leamy and lobed crust: fruit-stalks elongated out of the very substance of the frond, simple or branched, tubular or nearly solid, either dilated or tapering upwards, sometimes barren.)

A great genus, very difficult for the determination of its species, of which about 50 are described. Acharius divides it into six sections; in the first are *Lichen byssoides*, Engl. Bot. t. 373, and the beautiful *L. Beomyces*, t. 374; in the second *L. Papillaria*, t. 907; in the third *L. rubiformis*, t. 2112, and *caespitosus*, t. 1796; and in the fourth *L. delicatesus*, t. 2052, and *microphyllus*, t. 1782. These four sections comprise in all but 14 or 15 species.—The fifth is by far more considerable, consisting of the true cup-bearing Lichens, *Scyphisiferi* or *Psixidati* of authors, which terms express the cup-like dilatation of their fruit-stalks upwards. We have already spoken of this tribe; see LICHEN, sect. 7. Acharius defines 24 species, with numerous varieties. They seem to have engaged much of his attention. Beautiful specimens of them are his *Beomyces bacillaris*, (*Lichen filiformis*, Engl. Bot. t. 2028; *L. coccoiferus*, t. 2051; *bellidiflorus*, t. 1894; and *albicornis*, t. 1392.—The sixth section, consisting of 11 species, embraces the shrubby and awl-shaped kinds of Hoffmann's *Cladonia*. Such are *L. uncialis*, Linn. n. 107. Engl. Bot. t. 174; *rangiferinus*, n. 106. t. 173; and *vermicularis*, n. 108, t. 2029.

By the above detail, this arrangement of the Lichens by their fructification will be sufficiently intelligible to any who will bend their attention to the subject; and the more it is studied, the more honour will it be found to confer on its author. Whatever occasional laxity, or want of precision, may be observable in his use and adaptation of terms, will be found inevitable in so intricate a study, in which he was himself learning, as well as teaching, at every step. We have unfortunately not yet been able to procure a sight of his more recent publication, entitled *Lichenographia Universalis*; but from a manuscript scheme of the whole, and some information given by an intelligent friend, we learn that the great object of this work is the establishment of a new distribution of Lichenes, in which the genera are vastly multiplied. Most of the new ones seem formed out of the sections, or subdivisions, of those of his *Methodus*; so that he has here given into the plan of taking *habit* into the generic character, to a great extent. How far this may be eligible, we dare not, without seeing his reasons, decide. The few plates of the book in question are, as we understand, entirely subservient to this object, and the synonymy, as well as every thing relating to specific illustration, are but compendiously touched. Such subjects will receive a full and sufficiently diffuse exposition, in a new work, the first sheets of which we have lately been allowed to peruse, the *Lichenographia Britannica* of Mr. Dawson Turner, and Mr. William Borrer. This, when completed, will exhibit a finished history of the British species, the knowledge of which is nearly equivalent to an acquaintance with the characters of the whole order. An almost complete series of their figures is already before the public in the *English Botany*, to which we have so often referred. No other work, in any country, contains so many. The discrimination of the species, in this and the other tribes of British plants, has all along been a primary object of that publication: the new genera of Lichenes having been very cautiously adopted; indeed scarcely at all till lately, they having been considered by the author as in too

fluctuating a state, an idea which the above account will abundantly justify. The same reason, in addition to some inevitable impediments, has hitherto kept back the fourth volume of the *Flora Britannica*, where the Lichens will make a principal figure.

A very interesting work, on the dyeing properties of Swedish Lichens, is published at Stockholm, in 8vo. numbers, from the pen of Dr. Welsing. Seven numbers have reached us, in which 21 species of this natural order are illustrated by admirable coloured plates, with dissections, drawn by the hand of Professor Acharius himself, and accompanied by specimens of all the colours yielded by each species, the manner of procuring which is the chief subject of the Swedish letter-press. We regret that it is not given to the public in a language more generally understood. The variety of beautiful colours afforded by *Pulveraria* (or *Lepraria*) *chlorina*, t. 1, are very striking, and amount to 14, in which blue, green, and yellow are conspicuous. *Isidium Welsingii*, t. 4, yields beautiful shades of red, which colour, with different browns, is derived from most of the tartarous-crusted tribe. The leafy membranous ones seem to excel in browns, as *L. saxatilis*, t. 2; *omphalodes*, t. 7; and *encrasmus*, t. 19, Sm. Tr. of Linn. Soc. v. 1. 83. t. 4. f. 6. The cup-bearing kind appears also by the common *L. pyxidatus*, t. 17, to promise much in dyeing. When the high price of Orchard, *Lichen Rocella*, is considered, the investigation of different species under the guidance of improved chemistry, can hardly be thought an idle speculation, even by those who have no other motive for the study of nature.

We cannot conclude this article, without adverting to a subject, the consideration of which we have been disposed to put off as long as we could, because it is painful to differ decidedly from those who have made any subject their frequent and patient study, and to whom, moreover, natural science is so much indebted in other respects. We allude to the supposed transformation, for we can call it nothing less, of one species of this family into another. We can readily explain why *Lichen niger*, Engl. Bot. t. 1161, may seem to be turned into *plumbicus*, t. 353, from the seeds of the latter falling into the decayed crust of the former, and finding there a most excellent situation for their germination; as an acorn might vegetate in a bed of rotten moss. But the transformation of a tuft of moss into a forest of oaks would scarcely be a less miracle than that suggested above, or than the change of *Lichen tricolor*, or *cornuus*, into a *Sphæra*. It is but justice, indeed, to the excellent botanist who has asserted these changes, to declare, that we have no less extraordinary reports of the same kind from another quarter, respecting the progress from one species to another; in all which cases, doubtless, the intricacies of nature have deceived a most acute observer. We should scarcely venture to speak on this subject, however clear to our reason, from the botany of the closet only. A slight degree of practical observation will serve to convince any one, that the dissemination of many far more obvious plants than these, is hardly to be explained, and that the shifting scenes of nature, in the animal as well as vegetable theatre, are almost a metamorphosis. But we assert, with the confidence of experience, that the species of Lichens themselves, although undoubtedly liable to varieties like other plants, of which we have traced some curious instances amongst the alpine *Cyrophora* in particular, are as constant as those of any other plants, and even better defined than many of the most splendid. They differ indeed much in duration, somewhat in season, and above all perhaps in luxuriance, according to favourable or unfavourable circumstances; for they are

amongst the most hardy children of Flora, destined to thrive where others would perish, and to prepare the way for such as are less able to provide for themselves. To understand them well requires laborious research, and perpetual observation; but the curiosity and beauty of their structure will repay our toil, whilst, if we mistake not, the certainty of their characters and distinctions will afford satisfaction, as well as instruction to the scientific mind. 8.

LICHENOIDEÆ, Dill. Musc. 124. See LICHEN.

LICHFIELD, or LITCHFIELD, in *Geography*, an ancient city situated in the hundred of Oflow, and county of Stafford, England. According to the parliamentary returns of 1800, it then contained 873 houses, and 4712 inhabitants, of whom 1666 were found to be engaged in various trades and manufactures. The more ancient name of this city was Lichenfield, which, according to some antiquaries, signifies the "field of dead bodies," from a massacre of the Christians, said to have taken place here during their contests with the Pagans in the reign of the emperor Dioclesian. Mr. Shaw, however, in his "History of Staffordshire," expresses his decided opinion against the truth of this tradition, and with greater probability considers it as deriving its name from its marshy or watery situation; the word *Leccian*, from which *lic* comes, signifying, in Saxon, land covered with water. Lichfield is supposed to have arisen on the ruins of a Roman station called *Etactum*, which lies about a mile from the present city. Whether this idea be correct it is not easy to determine; but it seems to be clear that Lichfield was totally unknown, or, more properly speaking, had no existence either in the time of the Britons, or Romans. The origin of it, according to the best authorities, is attributed to the Saxons; and Mr. Shaw says, it was the first established seat of that people in England. In the year 669, when St. Chad was bishop of Lichfield, it was little more than a trifling village. Even after the Norman conquest, it was considered by the synod, then held at London, as too mean a place for the residence of a bishop, for till this time the bishops lived in an obscure manner; and seem to have done little towards adorning, or extending the town. However, trifling as it was, it received great honours and privileges from several of the Saxon kings. Borrocaphill, in the neighbourhood of this city, was in all probability one of the camps, or chief residences, of some Saxon princes; for, though no traces of building remain, the situation is too fine and commanding to have escaped the notice of that warlike people. In the reign of Henry I. Lichfield was encompassed with a ditch, and the castle was fortified by bishop Clinton. No part of the fortifications of the latter are now visible; but the field in which it stood is still denominated Cattlefield, and the ditch around the city may be easily traced by an attentive observer. The right of coivage was granted to the bishops of this diocese by king Stephen; but they did not enjoy this privilege for any considerable period. Bishop Langton, who flourished in the time of Edward I. was a great benefactor to this city, having built, among other things, an excellent bridge over the pool which separates the town from the clove. In the twenty-third year of the reign of the last-mentioned prince, (1305,) Lichfield first sent members to parliament, which it ever after continued to do. Edward VI. constituted it a city by charter in the year 1549. This charter gave the corporation power to appoint bailiffs and other chief officers, who should be entitled to hold all pleas within the precincts of the city. Queen Mary, with the authority of parliament, confirmed these privileges in the year 1553, and added several others of importance. The city, which before that time formed a member or parcel

parcel of Staffordshire, was then declared to be a county of itself for ever, from and after the ensuing fealt of St. Thomas. All actions of whatever denomination arising within the city, were ordained to be held by the bailiffs and citizens, if they could determine them, and if not by the justices next coming into the city, and not on any account by any authority out of the city. These great privileges were conferred in consequence of the faithful services of the citizens in the time of rebellion. Both these charters were ratified by queen Elizabeth, and afterwards confirmed by her successor James I. who granted still further immunities to this city. Charles II. confirmed all the privileges of this city, by a charter dated the 5th of November 1664. The government at present is vested in two bailiffs, elected from the common council, one of whom is named by the bishop, and the other by the council themselves, a recorder, a sheriff, a steward, and other inferior officers. The burgesses are twenty-four in number. Lichfield sends two members to parliament, the right of election being in the bailiffs, magistrates, freeholders of 40s. a-year, the holders of burghage tenements, and such freemen as are enrolled and pay foot and lot. The number of voters is estimated at 620.

This city has been the seat of a bishop's see from a very early period. The famous St. Coada was consecrated in the year 669. The great Offa, king of Mercia, of which Staffordshire formed a part, insisted upon his kingdom being governed by an archiepiscopal power, and that the bishop of Lichfield should be appointed to that dignity. Accordingly Adulphus, the successor of Sigebert, was created archbishop of Lichfield by pope Adrian, and the pall sent to him from Rome, about the year 785. Lichfield, however, did not long enjoy the pre-eminence it had thus acquired, for upon the death of Offa it was again reduced to a bishopric, at the earnest request of the archbishop of Canterbury, who presented pope Leo, the then possessor of the papal chair, with a large sum of money, in order to give weight to his entreaties. For a considerable period the bishoprics of Coventry and Lichfield were united, but at the reformation they were again disjoined. In the tower, built by bishop Clinton, king Richard II. is said to have kept his sumptuous Christmas festival, in the year 1397, when he consumed two hundred tuns of wine and two thousand oxen. This fortress was likewise the place of his confinement when on his way to the Tower of London as a prisoner, about two years afterward. Here he attempted to effect his escape, by slipping from the window of the high tower into the garden, but being discovered was carried back to his confinement. Lichfield has ever been celebrated for the attachment of its citizens to the cause of royalty. When the civil war commenced between king Charles and the parliament, his majesty having sent an order to the inhabitants of his loyal city to bring in their arms, his order was not only willingly complied with, but many of the inhabitants voluntarily subscribed considerable sums of money for his use, and enrolled themselves as soldiers under the command of captain Richard Dyott, for the protection of their own city against the parliamentary forces. This officer being joined by many gentlemen and gentlemen of the country under the earl of Chellerfield, the cathedral and clove were fixed upon as a proper place of defence from the height of its situation, and the strength of the fortifications around it. In a short time after the garrison was attacked by the republican troops. During this siege they maintained their post with great resolution, but the town as well as the cathedral suffered very material damage. In one assault, lord Brock, a most furious fanatic, who commanded the parliamentary army, lost his life in a manner somewhat

singular. Having drawn up his army about half a mile from Lichfield, and prayed most devoutly for the destruction of the cathedral, he ordered an immediate attack, and placed himself in a small house near the south gate, with the view of directing the operations of the gunners, whom he had stationed against this gate, in order, if possible, to open a breach. Upon some sudden accident which occasioned the soldiers to give a shout, lord Brock came to the door, and being perceived by a gentleman of the name of Dyott, who stood on the top of the tower, he levelled his piece at him, when the ball penetrated directly into the socket of the eye and lodged in the brain, causing instant death. As this happened on the festival of St. Chad, the patron of the church, the ball was supposed to have been guided by the influence of that saint. The loss of their commander, however, did not dismay the besieging army, who continued to carry on the siege with great vigour, and at last succeeded in compelling the garrison to submit. The troops of the parliament left to secure this fortress were in their turn attacked by prince Rupert, about the year 1643. Colonel Rowwell then commanded the garrison, who evinced the utmost bravery in the defence of his post. The commanding situations chosen by prince Rupert, however, for erecting his batteries, and the explosion of a mine, soon effected an extensive breach, and the garrison was compelled to surrender. The prince conferred the government on colonel Hervey Bagot, who maintained it for the king till the utter destruction of his majesty's affairs, when he very properly surrendered upon honourable terms.

Lichfield stands in a very pleasant and healthful valley, almost in the centre of England, at the distance of 120 miles from the metropolis. It is surrounded by hills of a moderate size, easy of ascent, and of very agreeable appearance. It is chiefly inhabited by gentry, being of little importance in a mercantile point of view. The buildings of this city have generally assumed the air and taste of modern times, and the spirit of improvement, so conspicuous in the present age, is plainly manifested in many alterations which have taken place within these few years. This city was formerly divided into two portions, by three lakes or pools of water, one of which is now dried up. It contains three parishes, but part of the lands of St. Chad's and St. Michael's lie without the boundaries of the city. Lichfield is adorned with a number of buildings well worthy of notice, both on account of their antiquity and the splendid style of their architecture. Of these the most conspicuous in every respect is the cathedral, which stands in the clove, and is said to have been fortified by bishop Clinton; though Dr. Shaw thinks he only repaired the fortifications which had existed there from the time of the Saxons. Some are of opinion, that the cathedral was first founded by king Oswy, in the year 655; but others attribute it to Peada, his son-in-law. Who was the first bishop is somewhat uncertain, but St. Chad is generally allowed that honour. The buildings of this cathedral, which was then called the Mercian church, were probably at first only constructed of wood. The whole of them were pulled down, in the year 1148, by bishop Clinton, and another of enlarged dimensions, and more elegant design, commenced in the place of the Saxon structure. To this prelate the cathedral is indebted for that noble stone vault, which is at this day the admiration of architects, and is undoubtedly one of the finest works of its kind extant in England. The next benefactor to this cathedral was Walter de Langton, who laid the foundation of the choir. He expended the sum of two thousand pounds on a shrine for the reliques of St. Chad, and obtained many privileges for the vicars and canons, one

of which was the right of hanging upon the next gallows, without trial, divers persons who withheld their lands from the church. This beautiful shrine continued in its full glory till the dissolution, when the cathedral was despoiled of this and many other valuable relics to satiate the avarice of the tyrannical Henry.

During the sieges which it sustained, as already mentioned, in the time of the civil wars, this noble building suffered much, being the first cathedral that fell into the hands of the parliament. The roof was stripped of its lead; and many of the curious statues, monuments, and other carved works, were demolished with axes and hammers. The costly and beautiful painted windows were battered to pieces. In short, little of this splendid structure escaped ruin, except the noble vaulted roof already mentioned. What did remain was ultimately destroyed in 1651, when colonel Danvers, by authority of the Rump Parliament, employed workmen in order to effect this purpose. At this time, the remarkable bell, called "Jesus bell," was knocked to pieces by a pewterer named Nicklin. During this perfection of the established church, Dr. John Hacket rendered himself remarkable by his courage and resolution. When a serjeant with a trooper were sent to stop the performance of the daily service, and, putting a pistol to his head, threatened to shoot him instantly if he did not desist, this noble prelate calmly, but resolutely, replied, "Soldier, I am doing my duty; do you your's?" a sentence which may justly be reckoned among the remarkable instances of the sublime, and which so impressed the minds of the soldiers, that they left him to the free exercise of the duty he thus evinced himself so worthy to perform. No sooner was he nominated to the bishopric of Lichfield, than he vigorously set himself to restore the ancient splendour of the cathedral. By his large contributions, the benefactions of the dean and chapter, and the money arising from his assiduity in soliciting aid from the gentlemen of his diocese, he succeeded in restoring this building to the admiration of the country. The whole underwent a thorough repair in the bishopric of Dr. James Cornwallis, when it received its last finish by the addition of a painted window at the east end of the choir, the execution of which reflects the highest honour on the artist Mr. Eginton. This cathedral is 411 feet in length, and 153 in breadth. From the centre rises a spire 256 feet high, of most elegant proportions. At the west front are two towers, terminated by spires, 66 feet in height. The portico can hardly be equalled by any thing of the kind in England. The chancel is paved with alabaster and channel stone, in imitation of black and white marble. The north door is particularly rich in sculpture. On the western front are a number of images, beautifully executed and arranged; the subjects of which are taken from the sacred writings. The statue of king Charles II. stands between the two western spires, where a figure of Adam, or of Christ, was also formerly placed, beneath which the other statues are ranged. These figures were originally all richly gilt and painted; but the embellishments have suffered much injury from the action of the elements. With regard to the interior ornaments of this church, they are by far too numerous to admit of particular notice in a work of this kind. Every part of it is filled with statues and tombs, both ancient and modern. The nave, 60 feet in height, is supported by pillars formed from a number of slender columns, with neat foliated capitals. Along the walls of the aisles are rows of arcades, with seats underneath. The upper windows in the nave are of uncommon appearance, being triangular, and including three circles in each; and over the western door is a very beautiful one, raised by the duke of York in the

reign of Charles II., and afterwards beautifully painted by a gift of the benevolent dean Akenbrooke. Behind the choir was the chapel of St. Mary, which contained a stone screen of the most elegant and splendid workmanship that can be imagined, embattled at the top, and adorned with several rows of niches most exquisitely finished. Each of these formerly contained a small statue. The stone screen was taken down during the late alteration, and the materials employed to fix the organ upon, and form pillars for the entrance into the choir. This chapel now forms part of the body of the choir. It is neatly paved, and contains, besides, forty-eight stalls, which are richly carved, and appropriated for the use of the members of the church. The altar is of free stone very neatly sculptured. The government of the cathedral is vested in a dean and four residentiary canons. The diocese of Lichfield, joined to Coventry, contains all the county of Stafford, (with the exception of Bromes and Clent,) all Derbyshire, and nearly one-half of Shropshire. The archdeacons are those of Coventry, Stafford, Derby, and Salop. The bishop's palace is situated at the north-east side of the clofe. The original building is said to have been founded by bishop Clinton, but it was probably of earlier date. This palace was quite destroyed in the civil wars, when bishop Hacket, having expended 1000*l.* on the prebendal house, fixed upon it as his residence. Whether the present palace is the same, or another wholly erected by his successor bishop Wood, is uncertain. It is now inhabited by different families; the bishop's residence having been for many years at Ecclell hall.

The next building worthy of notice is the church of St. Chad, now called Stowe church, and is generally considered as the oldest foundation in or near the city. By some writers it is even supposed to have been erected by the Romans, towards the end of the second century. St. Ceadda or Chadda, the saint to whom the church is dedicated, had his cell here in the year 653. The interior of this fabric has been lately repaired and beautified. It contains a number of neat monuments. The church of St. Mary's stands in the market-place, near the Guild-hall. Leland says, "St. Maries is a right beautiful piece of work, in the very market-place." The body of the present building is very neat, and is adorned with a handsome altar-piece, and a few ancient monuments to the memory of the family of the Dyotts. St. Michael's church is situated at the south-east extremity of the city, on the summit of Greenhill, and is remarkable for the extent of its burial-ground, which is scarcely to be paralleled in England. It contains within its limits not less than six or seven acres of excellent pasture land. This hill is remarkable for a court held here annually on Whitmonday, in a temporary stand of wood erected for the purpose. This court was anciently called the *Court of Array*, or view of men and arms. The high constables having assembled all the inhabitants, they perambulate the whole city; and the whole concludes with a procession through the principal streets to the market-place, where the town-clerk, in the name of the bailiffs and citizens, delivers an oration or charge to the high constables, thanking them for their attendance, and urging them to the due execution of their office. The origin of this remarkable custom is uncertain. On the top of the same hill, a small edifice has been erected by subscription, with seats; from this spot there is a very beautiful and extensive view of the circumjacent country, and of the many interesting objects it affords. South of Greenhill is Folly-hall, which also commands a very fine prospect. Not far from hence is the hospital and chapel of St. John, which was originally a monastery. When it was first founded is unknown. The front of the present building

building is remarkable for the number and antique form of its chimnies. According to an inscription over the door it was erected by bishop Smith, who was also the founder of Brazen-nose College, Oxford. The free grammar school, built at the same time with the hospital, stands nearly opposite to it.

This city can boast of having been the place at which some of the brightest ornaments of the two last centuries were educated. Among others were the unrivalled Garrick and his friend Dr. Samuel Johnson, whom Mrs. Barbauld designates as the Hercules of literature. The latter was born in a stuccoed house situated at the corner of Market-street, where his father kept a bookfeller's shop. The Guildhall, the theatre, and the free English school, are situated in Broad-street. The latter is an ancient building, erected and endowed by Thomas Minors about the year 1670. At the back of the Guildhall is a goal for the confinement of debtors and felons apprehended within the boundaries of the city. To the west of Bird-crest is a very pleasant seat called the Friary, having been formerly a monastery of Franciscan or Grey friars, founded about the year 1329. On the east side there still remains an antique monument in honour of a merchant named Richard. It is inscribed with a very singular epitaph, which the limits of this article, however, will not admit of being inserted. The residence of the late celebrated Dr. Darwin is situated in a street called Beacon-street, which was nearly burnt to the ground during the civil wars. Opposite to the shrobbery which surrounds Dr. Darwin's house is an hospital, built by Dr. Milley in the year 1704, for the support of fifteen poor women. Contiguous to this spot there formerly stood a very stately edifice, once the residuary house of the archdeacon of Chester. Lichfield contains, besides these, many objects which deserve the attention of the inquisitive and curious. The museum and the botanic garden of Dr. Darwin are particularly interesting to all who have the slightest taste for the subjects of natural history. Lichfield was long the residence of Miss Seward.

The markets are held here on Tuesday and Friday; the fairs on the three first Thursdays after Twelfth day, Ash Wednesday, May 1st, and the Friday before St. Simon and St. Jude. By means of canals this city communicates with a variety of rivers, some of which discharge themselves into the German ocean, and others into the Irish sea and St. George's channel. Harwood's History and Antiquities of Lichfield, 4to. 1806. Jackson's History of the City and Cathedral of Lichfield, 8vo. 1805. Shaw's History, &c. of Staffordshire, vol. i. folio.

**LICHTENBERG**, a town of France, in the department of the Lower Rhine; 22 miles N.N.W. of Straßburg.

**LICHTENAU**, a town of Austria; 12 miles W. of Crems.—Also, a town of Austria; 6 miles S.E. of Aigen.—Also, a town of Westphalia, in the bishopric of Paderborn; 9 miles S.E. of Paderborn. N. lat. 51° 32'. E. long. 8° 58'.—Also, a town of Hesse-Cassel; 13 miles S.E. of Cassel. N. lat. 51° 12'. E. long. 9° 24'.—Also, a town of Germany, in the principality of Hanau-Lichtenberg; 12 miles N.E. of Straßburg.—Also, a town of Germany, in the territory of Nuremberg, with a fortress on the Retzart, insulated in the margravate of Ansbach; 23 miles S.W. of Nuremberg. N. lat. 49° 17'. E. long. 10° 12'.—Also, a town of Prussia, in the province of Ermeland; 12 miles N.W. of Heilberg.—Also, an island near the W. coast of East Greenland. N. lat. 60° 30'. W. long. 45° 19'.—Also, a Moravian settlement in America, on the E. side of Muskingum river, 3 miles below Gochsachguenck; afterwards removed to Salem, 5 miles below Guadenhuett.

**LICHTENBERG**, a town of Prussian Pomerelia; 57 miles S.W. of Dantzic.—Also, a town of Germany, in the county of Henneberg; 8 miles S.E. of Meiningen.—Also, a town of France, in the department of Mont-Tournerre; 9 miles W.S.W. of Lautereck.—Also, a town of Silesia, in the principality of Neisse; 3 miles N.N.W. of Grotkau.—Also, a town of Germany, in the principality of Culmbach, on the Selnitz; having in its vicinity quarries of marble, and mines of copper and iron; 22 miles N. of Bayreuth. N. lat. 50° 22'. E. long. 11° 48'.—Also, a town of Saxony, in the circle of Erzgebirg; 5 miles S.S.E. of Freyberg.

**LICHTENECK**, a town of Carniola; 10 miles E.S.E. of Stein.

**LICHTENFELS**, a town of Austria, on the river Kamp; 7 miles E. of Zweth.—Also, a town of Bavaria, situated on the Maie; 20 miles N.N.E. of Bamberg. N. lat. 50° 10'. E. long. 11° 8'.

**LICHTENFELT**, a town of Prussia, in Pomerelia; 12 miles E.S.E. of Marienburg.

**LICHTENHAGEN**, a town of Prussia, in the circle of Natangen; 8 miles S.S.W. of Königsberg.

**LICHTENSTEIG**, a town of Switzerland, and capital of the county of Tockenburg, seated on the Thur, and the residence of a bailiff. It has places of worship for Roman Catholics and Protestants; 27 miles E. of Zurich. N. lat. 41° 17'. E. long. 9° 6'.

**LICHTENSTEIN**, a principality of Germany, on the E. side of the lake of Constance, situated on the Rhine, betwixt the lordships of Pludenz and Feldkirch.—Also, a town of Saxony, and chief place of a lordship, belonging to the counts of Schonburg; 5 miles N.E. of Zwickau. N. lat. 50° 44'. E. long. 12° 31'.

**LICHTENTANEN**, a town of Germany, in the principality of Culmbach; 7 miles N.W. of Bayreuth.

**LICHTENWALD**, a town of the duchy of Stiria; 12 miles S.E. of Cilly.

**LICHTENWALD**, a town of Prussia, in Ermeland; 23 miles N.W. of Heilberg.

**LICHVIN**, a town of Russia, in the government of Kaluga, on the Oka; 28 miles S. of Kaluga. N. lat. 54°. E. long. 35° 44'.

**LICHWE**, a town of Bohemia, in the circle of Königgratz; 6 miles W. of Czersberg.

**LICINIO, GIOVANNI ANTONIO**, in *Biography*. See **PORDENONE**.

**LICINIUM**, a word used by many chyrurgical writers to express a tent.

**LICINIUS**, in *Biography*, a Roman emperor, a native of Dacia, of an obscure origin, and accustomed from his infancy to the toils and hardships of rural life, became a Roman soldier, and rose through all the gradations of the service. He was raised to the rank of Augustus in the year 307. When the civil war broke out between Constantine and Maxentius, the former secured the friendship of Licinius by promising him in marriage his sister Constantia, which alliance took place in 313, when the two emperors had an interview at Milan, and joined in an edict in favour of the Christians. In the same year Maximin invaded the territories of Licinius, and took Byzantium and Heraclea; his success was very short lived, for Licinius advanced to meet him, and by his military skill obtained a complete victory. Maximin died soon after, and Licinius succeeded to his authority over the provinces of the East. The conqueror, who was harsh, ignorant, and brutal, knew not how to use his success with generosity or even with humanity; he put to death a great number of persons, and among others Val-

leria, the widow of Galerius, who had been a great benefactor to Licinius. This lady had taken refuge at his court, but terrified with his savage conduct, she took flight, and with her aged mother wandered long in disguise through the provinces; but being at length discovered, they were both beheaded, and their bodies thrown into the sea. After the display of these barbarities the two emperors did not live long in peace. A civil war broke out between them, in which the first battle was fought in 315; Licinius was vanquished, and after another attempt or two to maintain his ground against his rival, he was obliged to sue for peace, which he obtained on the condition of putting to death Valens, whom he had lately created Cæsar, and of resigning all his European provinces. In 317 he created his own son Cæsar, and peace was maintained during the eight following years. About this period, Licinius, growing suspicious of his Christian subjects, who seemed to be attached to his rival, began to banish them from about his person and palace, and to prohibit bishops from visiting each other, and from holding councils and assemblies. By degrees the restrictions that were laid upon them were exchanged for direct and cruel persecution, which produced another civil war in 323. The rivals met near Adrianople, and after some time spent in skirmishes, a general engagement was brought on, in which the superior skill of Constantine, and valour of his European soldiers, gained a very decisive victory over the much more numerous but less warlike host of Licinius. The vanquished emperor shut himself up within the walls of Byzantium, while his fleet was destroyed in the Hellespont by Crispus, the son of Constantine. Licinius escaped to Chalcedon, and collecting a new army made one more effort to oppose his foe, but being again defeated, he seems to have abandoned all ideas of farther resistance. He retired to Nicomedia, rather with a view of gaining some time for negotiation than with the hopes of effectual opposition. His wife Constantia, the sister of Constantine, interceded with her brother in favour of her husband, and obtained from his policy, rather than from his compassion, a solemn promise, confirmed by an oath, that after the resignation of the purple, Licinius should be permitted to pass the remainder of his days in peace and affluence. Licinius solicited and accepted the pardon of his offences, laid himself and the insignia of his office at the feet of the conqueror; he was raised from the earth with insulting pity, was admitted the same day to the imperial banquet, and soon afterwards was sent to Thessalonica, which had been chosen as the place of his confinement. His imprisonment was soon terminated by death, but whether this was occasioned by a tumult of the soldiers, or by a decree of the senate, is uncertain. He was accused of forming a conspiracy, and of holding a treasonable correspondence with the barbarians; but as he was never convicted, either by his own conduct or by legal evidence, his innocence, in this respect, has been presumed by many writers. The memory of Licinius was branded with infamy, his statues were thrown down, and by a rash edict, all his laws, and the judicial proceedings of his reign, were at once abolished. By this victory of Constantine, the Roman world was again united under the authority of one emperor. See CONSTANTINE. Gibbon.

LICINIUS CAIUS, a Roman tribune, of a plebeian family, rose to that rank by his own aspiring temper: he was the first plebeian who was raised to the dignity of master of horse to the dictator. He was surnamed *Stolo*, or *useless sprout*, on account of the law which he caused to be enacted during his tribuneship. By this law no person was permitted to hold more than 500 acres of land, it being alleged, that when more was held by one proprietor, he would not have

leisure to pull up the useless shoots (*Stolones*) which grew from the roots of trees. He afterwards carried a law which permitted the plebeians to share the consular dignity with the patricians, and was himself one of the first plebeian consuls, in the year 364 B.C.

LICINIUS, TEGULA, a comic Latin poet, flourished about 200 years before the Christian era. His fragments have been published by H. Stephens, and in the *Corpus Poetarum*, Maittaire. There was an orator and poet of this name, who lived at the same time with Cicero, and who has been compared with Catullus. His orations are highly commended by Quintilian: he is supposed to have written annals quoted by Dionysius Halicarnassus. He died in the 30th year of his age.

LICIO, in *Geography*, one of the smaller Lipari islands. N. lat. 38° 54'. E. long. 15° 20'.

LICK, a town of Prussia, with a castle; 80 miles S.E. of Königsberg. N. lat. 53° 39'. E. long. 22° 38'.

LICK, a name given to the salt-springs in the western parts of the United States.

LICKING, a navigable river of America, in Kentucky, which rises on the western confines of Virginia, interlocks with the head-waters of Kentucky river, runs in a north-west direction upwards of 180 miles, and by a mouth 150 yards wide through the south bank of Ohio river, opposite to Fort Washington. On this river are iron-works and numerous salt-springs. Its chief branch is navigable nearly 70 miles. From Limestone to this river the country is very rich, and covered with corn, rye-grass, and natural clover. Morfe.

LICKING *Creek*, a river of Maryland, which runs into the Potomack, N. lat. 39° 38'. W. long. 78° 5'.

LICKING *Hole Creek*, a river of Virginia, which runs into James river, N. lat. 37° 42'. W. long. 78° 5'.

LICKNENA, a town of Spain, in Arragon; 18 miles S.S.W. of Huesca.

LICKY, the name of a small river in the county of Waterford, Ireland, which falls into the river Blackwater, a little above Youghal.

LICNON, Λικνον, in the Dionysian solemnities, the mystical van of Bacchus; a thing so essential to all the solemnities of this god, that they could not be duly celebrated without it. See DIONYSIA.

LICNOPHORI, Λικνοφοροι, in the Dionysian solemnity, those who carried the licnon.

LICODIA, in *Geography*, a town of Sicily, in the valley of Neto; 18 miles S.W. of Lentini.

LICONDA, a town of Africa, in the country of Tripoli, situated on the sea-coast. N. lat. 30° 36'. E. long. 18° 10'.

LICOSTAMO, a town of European Turkey, in Thessaly, the see of a bishop, suffragan of Larissa; 16 miles E.S.E. of Larifa.

LICQUES, a town of France, in the department of the straits of Calais; 10 miles S. of Calais.

LICTORS, among the Romans, were officers established by Romulus, who always attended the chief magistrates when they appeared in public.

The duty of their office consisted in the three following particulars: 1. *Submotio*, or clearing the way for the magistrate they attended: this they did by word of mouth; or, if there was occasion, by using the rods they always carried along with them. 2. *Animadversio*, or causing the people to pay the usual respect to the magistrate, as to a knight, if on horseback, or in a chariot; to rise up, uncover, make way, and the like. 3. *Prætio*, or walking before the magistrates: this they did not confusedly, or all together, nor

by two or three abreast, but singly following one another in a straight line. They also preceded the triumphal car in public triumphs; and it was also part of their office to arrest criminals, and to be public executioners in beheading, &c. The ensigns were the *scales* and *securis*.

As to the number of *licitors* allowed to each magistrate, a dictator had twenty-four, a master of the horse six, a consul twelve, a prætor six; and each Vestal virgin, when she appeared abroad, had one.

**LICUALA**, in *Botany*, is the vernacular appellation of this palm among the natives of the Molucca islands. The name was adopted by Rumphius, and has been retained by all succeeding botanists. Linnæus and Willdenow properly refer it to the sixth class, ranking it there amongst others of the natural order of *Palme*, Schreber having classed it in his *Appendix Palmæ*. Schreb. 774. Linn. Syst. Veg. ed. 14. 313. Willd. Sp. Pl. v. 2. 201. Mart. Mill. Dict. v. 3. Thunb. Nov. Gen. 70. Juss. 39. Gært. t. 139.—Class and order, *Hecvandia Monogymia*. Nat. Ord. *Palme*, Juss.

Gen. Ch. Cal. Perianth inferior, three-cleft, permanent, outwardly hairy. Cor. of one petal, cleft almost to the base into three equal, ovate, acute, concave segments; Nectary annular, truncated, twice as short as the corolla. Stam. Filaments six, inserted into the nectary, erect, very short; anthers oblong, in pairs. Pist. Germen superior, convex, three-cleft, furrowed, smooth; style simple; stigmas two. Peric. Drupa globose, the size of a large pea. Seed a hard nut.

Efl. Ch. Calyx three-cleft. Corolla three-cleft. Nectary annular, truncated. Drupa single-seeded.

1. *L. spinosa*, Linn. and Willd., is the only species known; a native of the Moluccas, and figured by Rumphius in his *Herb. Amboin*. v. 1. 44. t. 9, under the name of *L. arbor*. The trunk of this palm is from three to four feet in height, and about the thickness of a man's arm, jointed, dividing in the upper part into five or six *footstalks*, scarcely so thick as a finger, triangular, their lower part serrated at the angles with thick rows of teeth or spines. Each of the stalks bears a *leaf* which is fan-shaped, and divided down to the base into about fourteen lateral, ribbed rays. *Flower-stalk* rising from the trunk, in the midst of the leaves, of the same length with them, and involved from the bottom in sheaths, dividing at the top into about five smaller ones, which bear green heads, in three rows, expanding into flowers. *Fruit* green for a long time, then brown or blackish. *Nut* oblong, very hard, longitudinally striated.

The natives of Macassar make use of the smaller leaves for tobacco pipes, after they are dried, rolled, and properly prepared. The larger leaves are used for packages, but the wood is not sufficiently durable to be considered useful.

**LICZ**, in *Geography*, a town of Austrian Poland, in Galicia; 30 miles W. of Przemyl.

**LID**, or **LYD**, a river of England, which runs into the Tamar, 4 miles N.N.W. of Tavistock.

**LIDA**, a river of Sweden, which runs into the Wenner lake, at Lidkioping.

**LIDA**, a town and castle of Lithuania, in the palatinate of Wilna, in which is held a provincial diet; 48 miles S. of Wilna. N. lat. 53° 52'. E. long. 25° 35'.

**LIDBECKIA**, in *Botany*, named by Bergius, in honour of Professor Eric Gustaf Lidbeck, of Lund, Knight of the order of Wasa, author of several botanical and economical treatises in the Stockholm Transactions. Berg. Cap. 306. Willd. Sp. Pl. v. 3. 2163. Juss. 183. (Lancitia; La-

marck. Illustr. t. 701. Gært. v. 2. 422.)—Class and order, *Syngenesia Polyantha-superflua*. Nat. Ord. *Compositæ Discoidæ*, Linn. *Corymbifera*, Juss. See **LANCISTIA**, and **COTULA**, section 2.

**LIDDEL**, **DUNCAN**, in *Biography*, a physician of the sixteenth century, was a native of Aberdeen; but he was elected professor of astronomy in the university of Helmstadt in 1587. He afterwards taught geometry, and ultimately medicine, of which he was appointed professor in 1596. He was likewise made first physician to the duke of Brunswick. But he quitted these advantages, and returned to his native country in 1607. He left the following works: "De Facultate vegetante ejusque Functionibus," Helmstadt, 1592; "Universe Medicinæ Compendium," *ibid.* 1605, 1620; "Ars medica succinctè et perspicuè explicata," Hamburg, 1607, several times reprinted; "De Febribus Libri tres," *ibid.* 1610; "Operum Iatro-Calculatorum, ex intimis Artis medicæ adytis et pentalibus erutorum," a posthumous work, Leyden, 1624. Eloy Dict. Hist.

**LIDDEL**, in *Geography*, a river of Scotland, which rises in Roxburghshire, and joins the Elk, three miles south of Longholm, in the county of Dumfries; giving to the valley in which it flows the name of Liddefdale, or Lithdale.

**LIDEN**, a town of Sweden, in Angermanland; 60 miles N.N.W. of Hernofand.

**LIDENS**, a town of Sweden, in the province of Medelpadia; 24 miles N.N.W. of Sundfval.

**LIDFORD**, a village of England, in the county of Devon, near the forest of Dartmoor, situated in a parish said to be the largest in England, including almost the whole of Dartmoor. It was formerly a fortified town, surrounded with walls and a moat, and having three gates, of which no trace now remains. It is supposed to have been destroyed by the Danes in the year 997. In this village is an ancient castle, in which courts are held for the duchy of Cornwall; and offenders against the stannary laws were here confined in a dreary and dismal dungeon, which gave rise to a proverb, "Lydford laws punish a criminal first, and try him afterwards." This village contains only about 15 houses, and its situation is bleak and dreary; 28 miles W. of Exeter. Cf. *Swetwall*.

**LIDHULT**, a town of Sweden, in the province of Smaland; 60 miles S. of Jonkoping. N. lat. 56° 50'. E. long. 15° 14'.

**LIDKIOPING**, a small, neat, trading town of Sweden, situated in the midst of a plain near lake Wetter or Wenner, at the influx of the Lide, and containing the episcopal palace, the cathedral, and the palace in which resides the governor of East Gothland; 42 miles E.N.E. of Uddevalla. N. lat. 58° 33'. E. long. 12° 54'.

**LIDL**, in *Biography*, a native of Germany, who arrived in England about the year 1785, and was a remarkable fine performer on the viol da gamba. His taste and expression on this ungrateful instrument were exquisite; though he had embarrassed himself with the additional difficulties of base strings at the back of the neck of his instrument, with which he accompanied himself, thrumming them in pizzicato with his left thumb; an admirable expedient in a desert, or even in a house, where there is but one musician; but to be at the trouble of accompanying yourself in a great concert, surrounded by idle performers who could take the trouble off your hands, and leave you more at liberty to execute, express, and embellish the principal melody, seemed at best a work of supererogation. The tone of the instrument will do nothing for itself, and it seems with music as with agriculture, the more barren and ungrateful the soil, the more art is necessary in its cultivation.

tion. And the tones of the viol da gamba are radically fo crude and nasal, that nothing but the greatest skill and refinement can make them bearable. A human voice of the same quality would be intolerable.

This excellent musician died of a consumption in London, at about 30 years of age, in 1788; as was the case, about the same time, with two other admirable German professors, and worthy men, Pfifer and Eichner. See their articles, and that of Lamotte, who had likewise been in England, and died young of a consumption.

LIDMEE, or *Indian Antelope*, *Antilope Cervicapra*, in *Zoology*, a species of antelope, having long, round, prominently annulated, tapering, and spirally twisted horns, which are smooth and sharp at the points. The body is of a brown colour above, and white on the under parts. This is the common and brown antelope of Pennant; the gazella africana S. antelope of Charleton, Ray, and Grew; the capra cervicapra of the Syst. Nat.; the capra bezoartica of Aldrov.; Olear.; the tragus strepticeros of Klein; the hircus gazella of Brisson; the Lidmee Arabium of Shaw's Travels.

It inhabits Barbary and India; it is somewhat smaller than a fallow-deer, brown clouded with reddish and dusky; the belly, breast, and inside of the thighs are white; the circumference of the orbits is white; the horns are erect, about sixteen inches long, of a black colour, and almost entirely covered with prominent rings, the points only being small, and are about twelve inches distant. The female has no horns, and after going nine months with young, brings generally twins. Pennant distinguishes between the Lidmee of Barbary and that found in India; though the only difference seems to consist in the greater size of the former, the latter being rather smaller than a roe. He likewise mentions horns frequently sent from India, which have been used as daggers, that seem to belong to this species, but with all their rings polished off.

LIDO di Malamocco, in *Geography*, a small island in the Adriatic, defended by a fort; 12 miles from Venice.

LIDO di Padesirina, a long island in the Adriatic, with a fort to defend the city of Venice.

LIDO di Sottomarino, a town in the island of Chioggia, forming as it were the suburbs of that city.

LIDS, a small island in the Baltic, near the south coast of Laaland. N. lat. 54° 41'. E. long. 11° 20'.

LIE, a town of Arabia, in Yemen; 20 miles S. of Abuarifch.

LIE, or *Lye under the Sea*. See LYING, &c.

LIEBAU, in *Geography*, a town of Silesia, in the principality of Schweidnitz, on the river Schwartbach; 22 miles S. of Schweidnitz.

LIEBAU, *Liebe*, or *Libona*, a town of Moravia, in the circle of Prerau; 13 miles N. of Prerau. N. lat. 49° 38'. E. long. 17° 28'.

LIEBENAU, a town of Silesia, in the principality of Glogau; 8 miles W.N.W. of Glogau. N. lat. 52° 25'. E. long. 15° 56'.—Also, a town of the principality of Hesse, on the Dimel; 20 miles N.W. of Cassel. N. lat. 51° 30'. E. long. 9° 22'.

LIEBENGRUND, a town of Saxony, in the circle of Neustadt; 14 miles S. of Neustadt. N. lat. 50° 30'. E. long. 17° 41'.

LIEBENTHAL, a town of the duchy of Stiria; 12 miles S.E. of Gratz.—Also, a town of Bohemia, in the circle of Chrudim; 13 miles E. of Hohenmaut.—Also, a town of Silesia, in the principality of Jauer; 30 miles W. of Jauer. N. lat. 50° 57'. E. long. 15° 37'.—Also, a town

of Saxony, in the margravate of Meissen; 7 miles S.W. of Stolpen.

LIEBENWALD, a town of Brandenburg, in the Middle Mark, on the Havel; 24 miles N. of Berlin. N. lat. 52° 51'. E. long. 13° 30'.

LIEBENWARDA, a town of Saxony; 22 miles N. of Meissen. N. lat. 51° 28'. E. long. 13° 26'.

LIEBENZELL, or ZELL, a town of Wirtemberg, on the Nagold; having two warm baths in its vicinity; 35 miles E.N.E. of Straßburg. N. lat. 48° 51'. E. long. 8° 43'.

LIEBEROSE, a town of Lusatia; 17 miles W. of Guben. N. lat. 52°. E. long. 14° 16'.

LIEBETEN, a town of Hungary; 65 miles N.N.E. of Gran.

LIEBMUHL, a town of Prussia, in the province of Oberland, with a castle; 66 miles S.S.W. of Königsberg. N. lat. 53° 42'. E. long. 19° 45'.

LIEBO SEE, a lake of Brandenburg, in the Ucker Mark; situated to the S. of Dolgen See.

LIEBSTADT, a town of Saxony, in Meissen; 14 miles S.S.W. of Dresden.—Also, a town of Prussia, in Oberland, with a castle; 48 miles S.S.W. of Königsberg. N. lat. 53° 57'. E. long. 25° 2'.

LIECHEN, a town of Brandenburg, in the Ucker Mark; 40 miles N. of Berlin. N. lat. 53° 12'. E. long. 13° 24'.

LIECHSTAL, or LIESTAL, a tolerably fruitful district of Switzerland, containing a small, regularly built, populous town of the same name, consisting of three parallel streets, in the canton of Basle; 2½ leagues S.E. of the capital, on the river Ergetz, which forms a cascade below it. In this district are the remains of a large Roman aqueduct.

LIEES, *Fr.*, a musical term, equivalent to tied, bound, sustained. It likewise implies blurred, in music, for bowed instruments, when two or more notes are played with one stroke of the bow, or with one touch of the tongue on the flute or hautbois. What musicians call a *sur* is a semicircle, (—). The same character is used over or under two or any number of notes, in vocal music, that are sung to one syllable.

LIEFDE BAY, in *Geography*, a bay on the north coast of Spitzbergen. N. lat. 70° 32'. E. long. 12° 30'.

LIEGE, a bishopric and electorate of Germany, before the French revolution; bounded on the north by Brabant; on the east by Limburg, Juliers, and Luxemburg; on the south by Luxemburg and the French department of the Ardennes; and on the west by Brabant, Namur, and Hainaut; about 80 miles in length from north to south, and of an irregular breadth. The soil is fertile, yielding corn and pastures, and also wine that resembles the midding wines of Burgundy and Champagne. In this district are also considerable forests, and mine-works of copper, lead, iron, and coal, stone quarries, and some of marble. Its chief mineral waters are those of Spa and Chaudfontaine. Its principal rivers are the Meuse and Sambre. This bishopric is now united to France, and forms the department of the *Ourte*; which fee. Its chief exports are beer, arms, nails, serge, leather, and coal. It formerly contained 26 towns, divided into Walloon and Flenish.

LIEGE, a city of France, and capital of the department of the Ourte, and a bishop's see. It is large, populous, and rich, divided into four parts, each consisting of 12,500 inhabitants, and four cantons; the 1st containing 16,664 inhabitants, on a territory of 12½ kilometres, in four communes; the 2d canton, including 13,966 inhabitants, on a territory of 20 kilometres, in two communes; the 3d comprehending

17,408 inhabitants, on a territory of 15 kilometres, in two communes; and the 4th containing 17,237 inhabitants, on a territory of 25 kilometres, in one commune. This city is situated on the Meuse, in a pleasant valley between hills, watered by the rivers Loofe, Ourte, and Ambleve, which discharge themselves into the Meuse, as it enters this city. It is proverbially called the hell of women, the purgatory of men, and the paradise of priests. Liege has ten grand faubourgs, and two smaller, 16 gates, 17 bridges, and 154 streets, and also two quays planted with rows of trees. Before the revolution, it had within the city and faubourgs, besides the cathedral, seven collegiate and 50 parish churches, and 46 religious houses. The cathedral of St. Lambert is a large building, erected by St. Hubert in the year 712, on the spot where his predecessor St. Lambert, bishop of Maestricht, had suffered martyrdom. On the 22d of November 1792, Dumourier, at the head of the French troops, took possession of Liege; but in the following March they were driven out of Liege and Brabant. In 1794 the French troops again entered Liege, and it was annexed to the dominions of France. N. lat. 50° 40'. E. long. 5° 37'. Accounts are kept in this city in florins or gulden current; each florin being divided into 20 fous or fivers, and each fiver into 16 pfenings. The fiver is sometimes divided into four oertjes or liards. The patacon of account is four florins, eight efcalus or schillings, or 80 fivers. The gold coins of Liege are the ducat of 8½ current florins or 17 efcalins, the florin d'or or gold gulden of 5 current florins or 10 efcalins. The silver coins are the patacon of 4½ current florins or 8½ efcalins, the efcalin of 10 fivers, and the blamafe of five fivers. The fiver is a copper coin. Since the year 1792 there has been no coinage at Liege; the city and its territory having been soon after united to France, and the new French momes and coins introduced here. The commercial weight of Liege is four per cent. less than that of Amfterdam; 21lbs. of Liege being = 22lbs. avoirdupois nearly. A laft of corn contains 96 fetiers, the fetier being 1827 English cubic inches, fo that 20 fetiers are = 17 English bushels. The foot is 11½ English inches, the ell is 21½ English inches; fo that 18 feet of Liege = 17 English feet, and 63 ells of Liege = 38 English yards. Since its union with France, Liege has adopted the new French denominations of money in the business of exchanges. Kelly's Univ. Cambist. vol. i.

Citizen Gretry, the eminent composer of French comic operas, a native of that city, in his Memoirs, vol. i. p. 125, gives an account of the college established at Rome for the reception of students in all the arts from the city of Liege. There was a time, before Rome was bereaved of its models of perfection, that we should have devoutly wished for an English college of arts, similar to that of France and Liege, where our young artists of promising talents, pining to visit Italy, but unable to bear the expence, might have an asylum in which they could be received and supported during a certain number of years, while they were pursuing their studies. Such an establishment would reflect honour on an opulent and learned nation, always disposed to patronize, and collect specimens in all the fine arts, particularly in painting, music, sculpture, and architecture.

LIEGE, *Ligiur*, properly signifies a *vassal*, who holds a kind of fee that binds him in a closer obligation to his lord than other people.

The term seems to be derived from the French *lier*, to bind; on account of a ceremony used in rendering faith or homage; which was by locking the vassal's thumb, or his hand, in that of the lord, to shew that he was fast bound by his oath

of fidelity. Cujas, Vigenere, and Bignon, choose rather to derive the word from the same source with *leudis*, or *leodi*, *loyal*, *faithful*. But Du-Casse falls in with the opinion of those who derive it from *liti*, a kind of vassals, so firmly attached to their lord, on account of lands or fees held of him, that they were obliged to do him all manner of service, as if they were his domestics. He adds, this was formerly called *ligium servitium*, and the person *lige*. In this sense, the word is used, Leg. Edw. cap. 29. "Judex sub tutela regis ligea debent esse;" that is, wholly under his protection.

By *lige* homage, the vassal was obliged to serve his lord towards all, and against all, excepting his father. In which sense, the word was used in opposition to *simple* homage; which last only obliged the vassal to pay the rights and accustomed dues to his lord; and not to bear arms against the emperor, prince, or other superior lord; so that a *lige man* was a person wholly devoted to his lord, and entirely under his command.

"Omibus, &c. Reginaldus, rex Insularum, salutem. Sciatis quod deveni homo ligeus domini regis Anglie Johannis, contra omnes mortales, quamdiu vixerio; et inde ei fidelitatem et sacramentum prelati, &c." MS. penes W. Dugdale.

But it must be observed, there were formerly two kinds of liege homage: the one, by which the vassal was obliged to serve his lord against all, without exception even of his sovereign; the other, by which he was to serve him against all, except such other lords as he formerly owed liege homage to. See HOMAGE.

In our old statutes, lieges, and liege people, are terms peculiarly appropriated to the king's subjects; as being *ligei*, *ligi*, or *ligati*, obliged to pay allegiance to him; 8 Hen VI. 14 Hen. VIII. &c. though private persons had their lieges too.

"Reinaldus, Dei gratia, abbas Ramefæ, præposito et hominibus de Brancefere, et omnibus vicinis Francis et Anglis, salutem. Sciatis me dedisse terram Ulfe, in depedene (hodie depedale) huic Boselino, et uxori ejus Alfnæ—ea conditione quod effecti sint homines." Lib. Ramef. See ALLEGIANCE and FEALTY.

LIEGE *vassalage*. See VASSALAGE.

LIEGNITZ, or LIGNITZ, in *Geography*, a town of Silesia, one of the best as well as most ancient in the country, and capital of a principality of the same name; situated on the Katszbach. The palace, within the town, is surrounded with a moat and high wall. Here, in a very stately stone edifice, the states of the provinces assemble. The Lutherans have two churches in this town; and the Roman Catholics are in possession of the collegiate church, a magnificent college, and other religious foundations. The emperor Joseph founded here a spacious academy for the instruction of young gentlemen of both religions in military exercises. The trade of Lignitz in cloth and madder is considerable; 32 miles W. of Breslaw. N. lat. 51° 11'. E. long. 16° 10'.

LIEN, *Fr.*, a word used in the law, of two significations: *personal* lien, such as bond, covenant, or contract; and *real* lien, a judgment, statute, recognizance, which oblige and affect the land. Term de Ley.

Lien signifies an obligation, tie, or *claim* annexed to, or attaching upon any property; without satisfying which such property cannot be demanded by its owner. Thus, the costs of an attorney are a *lien* upon deeds and papers in his hands; a factor has a lien on goods in his hands for balance due from his principal. &c.

LIEN-CHAN-POU, in *Geography*, a town of Chinese Tartary; 12 miles N.N.E. of Ning-yaen.

LIENIS.

LIENIS INPARCTUS. See SPLEEN.

LIEN-TCHEOU, in *Geography*, a city of China, of the first rank, in the province of Quang-tong, seated on the river Lien-kiang, which forms a very convenient harbour for Chinese barks. The territory of this city borders on the kingdom of Tong-king, from which it is separated by inaccessible mountains. It has under its jurisdiction one city of the second class, and two of the third. N. lat. 21° 40'. E. long. 108° 30'.

LIENTERY, in *Medicine*, signifies that variety of diarrhœa, in which the alimentary matters pass off by stool, in an undigested or almost unchanged state. The term is derived from *LIENS*, smooth, or polished, and *VIÆRIS*, intestines, the ancients having been of opinion, that this affection was owing to the too great smoothness and lubricity of the internal membrane of the intestines, which allowed the food to slip off in an undigested state.

Some writers have treated of the lientery as a disease altogether distinct from diarrhœa; but Dr. Cullen properly considered it as only a variety of that complaint. The principal cause of the lenteric diarrhœa appears to consist in a morbid state of irritability of the stomach and bowels; whence the former organ is excited to an excessive motion of its muscular coat, by the stimulus of whatever aliment is introduced into it, and consequently expels it into the bowels in an undigested state; and the latter, being likewise morbidly sensible to the same stimulus, hurries on the undigested matter speedily through the whole canal. The motions are at the same time loose or liquid, because, on the one hand, the undigested matter is not taken up by the lacteals, and, on the other, the irritation of this matter, thus rapidly passing, excites the exhalent vessels, and the excretories of the mucous glands to pour out a more abundant quantity of their fluids. This affection is generally accompanied with a great weakness of the digestive power, as well as a morbid irritability of the stomach.

From this view of the subject, two indications present themselves with a view to the method of cure in lientery; namely, first, to lessen the irritability of the whole alimentary canal; and secondly, to strengthen the digestive power of the stomach. For it must be observed, that, although food, when converted into a proper bland chyle by the process of digestion, passes through the bowels without producing any irritating effect: yet the same food, when it is transmitted into them from the stomach in a crude and unaltered condition, operates as an extraneous and foreign matter on the irritable villous lining of the bowels, and excites them to an extraordinary peristaltic action.

The first indication, of allaying the irritability of the stomach and intestines, is to be fulfilled by the administration of opiates, or other narcotic medicines, and of astringents. Opium itself is the most effectual soother of morbid irritability that we possess; and in cases, like that under consideration, its operation is improved by the union of some aromatic substance; hence the form of the opiate confection, according to the formula of the London pharmacopœia, is a grateful and efficacious medicine for this purpose. But the irritability is still more effectually allayed, when astringents and absorbents are employed at the same time with the opiates; the best of these are the catechu, kino, and the terebinthaceous powders, or chalk. The confection catechu of the Edinburgh pharmacopœia, which combines the opiate, astringent, and aromatic in one substance, is a valuable medicine for the fulfilment of this indication. These substances may be administered in a little distilled water of some aromatic vegetable, as of mint, cinnamon, pimento, &c.

Or, with a view to the second indication, of strengthening the digestive power of the stomach, the same medicines may be combined or alternated with the tonic bitter medicines; such as the infusion of calcarilla, gentian, or orange-peel, or the decoction or infusion of the cinchona. At the same time moderate exercise, especially on horseback, will aid in re-establishing the functions of the stomach; and all cold and debilitating articles of diet, or substances of difficult solubility, should be studiously avoided. Of the former are ice, fallads, water-cresses, cucumbers, or other raw vegetables, vegetable acids, &c. We once witnessed a severe instance of lientery, which was brought on by eating a little ice-cream, at a time when a considerable degree of indigestion already prevailed; it appeared at once to sink the feeble digestive powers of the stomach, and the food was discharged almost unchanged. Of the latter, or food of difficult solubility, we may mention cheese, hard or salted meats, fatty substances, &c. which require all the energy of the healthy stomach to subdue them into chyle. When the alimentary canal is in the irritable condition above-mentioned, it is advisable for the invalid to avoid active exercise immediately after his meals, which is liable to hurry on the food into the intestines before the digestion is completed, and thus to occasion a lenteric attack. We have known persons, subject to habitual indigestion, or at least great feebleness of stomach, who at those times certainly brought on a diarrhœa of the lenteric kind, unless they remained quiet for some time after every meal. See DIARRHŒA.

LIEOU-KIEOU, in *Geography*, islands situated between Corea, Formosa, and Japan, which are 36 in number. The principal and largest is called *Lieou-kiou*, and the rest have each a particular name. The large island extends from N. to S. almost 440 lys (200 lys making 60 geographical miles), and 120 or 130 from E. to W.; but on the S. side, the extent from E. to W. is not 100 lys. The S.E. part of the island, where the king resides, is called "Cheouli," and it is in this part (according to Grotius, but in the S.W. part according to d'Anville and others), that "Kint-ching," the capital city, is situated. (See KIN-TCHIN.) These isles form a powerful and extensive empire, the inhabitants of which are civilized, and ought not to be confounded with other savage nations dispersed throughout the islands of Asia. If we believe the islanders themselves, the origin of their empire is lost in the remotest antiquity. They reckon 25 successive dynasties, the duration of which forms a period of more than 18,000 years; but it is needless to expose the absurdity of these pretensions. It is certain, however, that the existence of the country called Lieou-kiou was not known in China before the year 605 of the Christian era. In the course of this year one of the emperors of the dynasty of Soui deputed some messengers to enquire into their situation. Some information having been obtained concerning them, the emperor Yang-ti sent skillful persons, accompanied by interpreters, to summon the prince to do homage to the emperor of China, and to pay him tribute. The king of Lieou-kiou took offence, and returned an answer to the demand, that he acknowledged no prince to be his superior. An armament was fitted out by the emperor, and a fleet, in which was embarked 10,000 men, was equipped for the expedition. This fleet arrived in safety at the port of Napakiang, and, in spite of the natives, the army landed on the island. The king fell in battle, upon which the Chinese pillaged, sacked, and burnt the royal city, made more than 5000 slaves, and returned to China. In 1291 Ching-tson, emperor of the dynasty of Yuen, thought of reviving the pretensions of his predecessors; and fitted out a fleet to subdue

these islands; but this fleet proceeded no further than the isles of Pong-hou, and the western coast of Formosa, from whence, under various pretensions, they returned to Fo-kien. It was not till the year 1373, under the reign of Hong-vou, founder of the dynasty of Ming, that these islands voluntarily submitted to the Chinese government. T'fay-tou, the prince, was solemnly declared a vassal of the empire; and when Hong-vou had received his first tribute, consisting of valuable horses, aromatic wood, sulphur, tin, &c. he sent to this prince a golden seal, and confirmed the choice he had made of one of his sons for a successor. The emperor afterwards sent 36 families, almost all from the province of Fo-kien, to Lieou-chieou. These families were hospitably received, and had lands assigned them near the port of Napa-kiang, and certain revenues were appointed for their use. These families first introduced into Lieou-kiou the learned language of the Chinese, the use of their characters, and the ceremonies practised in China in honour of Confucius. On the other hand, the sons of several of the grandees of the court of T'fay-tou were sent to Nan-king to study Chinese in the imperial college, where they were treated with distinction and maintained at the emperor's expence. As these isles had neither iron nor porcelain, they were supplied by Hong-vou. Commerce, navigation, and the arts soon began to flourish. These islanders learned to cast bells for their temples, to manufacture paper and the finest stuffs, and to make porcelain, with which they had before been supplied from Japan. The subsequent revolution, which placed the Tartars on the imperial throne of China, produced no change in the conduct of the kings of Lieou-tcheou. The emperor Kang-hi (about A.D. 1720) paid a more marked attention to these isles than any of his predecessors. He caused a superb palace to be erected in honour of Confucius, and a college, where he maintained masters to teach the sciences and the Chinese characters. He also instituted examinations for the different degrees of the literati. He ordained that the king of Lieou-kiou should never send in tribute rose-wood, cloves, or any other production which was not of the growth of the country; but that he should find a fixed quantity of sulphur, copper, tin, shells, and mother-of-pearl, which is very beautiful in these islands. He permitted, that, besides the usual tribute, he might present him with horse furniture, pistol-cases, and other things of the same kind, which these islanders are said to manufacture with great taste and neatness.

It is more than 900 years, says Grosier, since the bonzes of China introduced at Lieou-kiou the worship of Fo, and the principal books belonging to their sect. This worship is at present the established religion both of the grandees and of the people. In the royal city there is still to be seen a magnificent temple, erected in honour of another idol borrowed from the Chinese, named *Tien-fey*, which signifies "celestial queen, or lady." These islanders do not swear or make promises before their idols. For this purpose they burn perfumes, present fruits, and stand reverently before some stone, which they call to witness the solemnity of their engagements. Of these stones many are to be seen in the courts of their temples, in most public places, and upon the mountains; and they are appropriated to this use. They have also among them women consecrated for the worship of spirits, who are supposed to have great influence over these beings. They visit the sick, distribute medicines, and write prayers for their recovery. They respect the dead as much as the Chinese, but their funerals are less pompous. They burn the flesh of the deceased, and preserve only the bones. They place round them lamps, and burn perfumes, and different families are distinguished by surnames, as in China;

but a man and woman of the same surname are not allowed to marry. The king is not at liberty to marry except in the three grand families, among which the highest offices are distributed. A plurality of wives is allowed in these isles. The women are very reserved; they neither use paint, nor wear pendants in their ears; they collect their hair on the top of their heads, in the form of a curl, and fix it in that manner by long pins made of gold or silver. Besides the vast domains which the king possesses, he receives the produce of all the sulphur, copper, and tin-mines, and of the salt-pits, together with what arises from the taxes; and from these revenues he pays the salaries of the mandarins and officers of his court. Of the mandarins there are, as in China, nine orders, distinguished by the colour of their caps, or by their girdles and cushions. In the royal city tribunals are established for managing the revenue and affairs of the principal island, and of all the others dependent upon it. There are also particular tribunals for civil and criminal matters, for the affairs of religion, for manufactures, commerce, navigation, &c. The vessels built in this country are highly valued by the people of China and Japan. In these the natives sail not only from one island to another, but also to China, Tonquin, Cochinchina, Corea, &c. Besides those articles of commerce, which their manufactories of silk, cotton, paper, arms, copper utensils, &c. furnish them, they also export mother-of-pearl, tortoise and other shells, coral and whetstones, which are held in high estimation both in China and Japan. Three languages are spoken in the isles of Lieou-kiou, different from those of China and Japan. The language of the large island is the same as that of the neighbouring isles; but it differs from those of the isles which lie to the S.W. and N.E. Letters, accounts, and all the king's orders are written in Japanese characters, not in the language of the country; books of morality, history, medicine, astronomy, and astrology, are written in Chinese characters. The distribution of time, and the division of the year, are the same in Lieou-kiou as in China. The edifices, temples, and palace of their kings are built after the Japanese manner; but the houses of the Chinese, the hotel of the ambassador, the imperial college, and the temple of the goddesses "*Tien-fey*," are built after the fashion of China. The natives of Lieou-kiou are, in general, mild, affable, and temperate; they are active and laborious, enemies to slavery, and detest falsehood and dishonesty. Excepting the grandees, bonzes, and Chinese established in Lieou-kiou, few of the inhabitants of these islands can either write or read. The people are fond of games and diversions. They celebrate with great pomp and splendour, those festivals that are instituted in honour of their idols, and those which are appointed for the termination and commencement of the year. Great harmony prevails among families and individuals, which they take care to preserve by frequent repasts, to which they invite one another. Suicide is unknown among these islanders; and they are free from those crimes that are common in the isles situated to the N.E. of them, which being nearer to Japan, have adopted the vices of its inhabitants, as well as their manners and customs. Grosier's China, vol. i. The capital is in N. lat. 26 2'. E. long. 128 40'.

LIEOU-TCHEOU, a town of Corea; 37 miles S.E. of King ki-tao.—Also, a city of China, of the first rank, in the province of Quang-fu, situated on the river Leng. N. lat. 24 12'. E. long. 108 47'.

LIEPE, a town of Prussia, in the palatinate of Culm; 14 miles E.S.E. of Culm.

LIEPPE, a town of Prussia, in Oberland; eight miles from Osterrod.

**LIERGANES**, a town of Spain, in the province of Biscay; 10 miles S.E. of Santander.

**LIERN**, a town of the republic of Lucca; 7 miles N.W. of Lucca.

**LIERNAIS**, a town of France, in the department of the Côte-d'Or, and chief place of a canton, in the district of Beaune; 10 miles N.W. of Arnay-le-Duc. The place contains 705, and the canton 8602 inhabitants, on a territory of 260 kilometres, in 15 communes.

**LIERNES**, a town of France, in the department of the Two Nethe, and chief place of a canton, in the district of Malines, seated on the Nethe; 10 miles S.E. of Antwerp. The place contains 9581, and the canton 13,159 inhabitants, on a territory of 105 kilometres, in four communes.

**LIETZAN**, a town of the Middle Mark of Brandenburg; 15 miles S.W. of Custrin. N. lat. 52° 28'. E. long. 14 30'.

**LIEURE**, a town of France, in the department of the Straits of Calais; 11 miles S. of Calais.

**LIEUREY**, a town of France, in the department of the Eure; 7 miles S. of Pont-Audemer.

**LIEUTAUD, JAMES**, in *Biography*, a French mathematician, who flourished in the former part of the eighteenth century, was the son of a gun-smith at Arles, and died at Paris in the year 1733. He particularly attached himself to the study of astronomy, and from the great proficiency which he made in this branch of knowledge, he obtained a seat in the French Academy of Sciences. He published twenty-seven volumes of the "Connoissance des Temps," from the year 1703 to 1739.

**LIEUTAUD, JOSEPH**, a celebrated physician and anatomist, was born at Aix, in Provence, on the 21st of June, 1703. His family had been established from time immemorial at Aix, and had produced a great number of distinguished officers, ecclesiastics, lawyers, and useful citizens. He was at first intended by his parents for the church; but the reputation of his maternal uncle, Garidel, the professor of medicine in his native place, gave him a bias to the study of medicine. Botany was the first object of his pursuits. He travelled into the countries which Tournefort had surveyed before him, and brought back many plants which had escaped the observation of that distinguished botanist. This success gained him great applause in the universities of Aix and Montpellier, and he soon obtained in the former the reversion of the chairs of botany and anatomy, which his uncle had long filled. Being appointed physician to the hospital at Aix, the necessity of pursuing his anatomical studies presented itself to his mind, together with the greater facilities which this appointment afforded, and he thenceforth nearly abandoned the subject of botany. His audience soon became numerous, comprising many persons not engaged in the study of medicine, and among others the marquis d'Argens, the intimate friend of the king. M. Lieutaud published, in 1742, a syllabus of anatomy for the use of his pupils, entitled "Essais anatomiques, contenant l'Histoire exacte de toutes les Parties qui composent le Corps humain;" it was several times reprinted, with improvements, and in 1777 was edited by M. Portal, in two volumes. He communicated also several papers on morbid anatomy, to use a common phrase, and on physiology, to the Academy of Sciences, of which he was elected a corresponding member. In 1749, however, he quitted his post at Aix, and went to Versailles, at the instance of the celebrated Senac, who then held the highest appointment at court, and who obtained for Lieutaud the appointment of physician to the Royal Infirmary. This act of friendship is

faid to have originated from the private communication of some errors, which Lieutaud had detected in a work of M. Senac, and which he did not deem it proper to publish. At Versailles he continued his anatomical investigations with unabated zeal, and was soon after his arrival elected assistant-anatomist to the Royal Academy, to which he continued to present many valuable memoirs. He also printed a volume, entitled "Elementa Physiologia, &c." Paris, 1749, which had been composed for the use of his class at Aix. In 1755, he was nominated physician to the royal family, and, twenty years afterwards, he obtained the place of first physician to the king, Louis XVI. In 1759, he published a system of the practice of medicine, under the title of "Precis de la Médecine pratique," which underwent several editions, with great augmentations, the best of which is that of Paris, 1770, in two volumes, 4to. In 1766, he published a "Precis de la Matière médicale," in 8vo. afterwards reprinted in two volumes. But his most important work, which still ranks high in the estimation of physicians, is that which treats of the seats and causes of diseases, ascertained by his innumerable dissections. It was entitled "Historia Anatomico-médica, siliens numerosissima cadaverum humanorum extirpata," Paris, 1767, in two volumes, 4to. M. Lieutaud died on the 6th of September, 1780, after an illness of five days. Eloy Dict. Hist. Hist. de l'Acad. Roy. des Sciences, for 1780, p. 48.

**LIEUTENANT, LOCUMTENENS**, a deputy, or officer, who holds the place of a superior, and discharges in his absence the duties of the office which he ought to exercise in person. The term is originally derived from *legatus* (which see), and more immediately from the French *lieutenant*, supplying or holding the place of another.

Of these, some are civil; as lords lieutenants of kingdoms; who are the king's viceroys, and govern in his stead, such as the lord lieutenant of Ireland; and lords lieutenants of counties. See **LORDS Lieutenants**.

But the term is most frequent among military men, among whom there is a variety of lieutenants.

**LIEUTENANT** is the second commissioned officer in every company of both foot and horse, and next to the captain, who takes the command upon the death or absence of the captain. Fusilier corps, grenadiers, and light infantry, have second lieutenants and no ensigns. See **CAPTAIN**.

**LIEUTENANT of Artillery**, is an officer of the artillery in each company, of which there are one first and three second lieutenants. The first lieutenant has the same detail of duty with the captain, because, in his absence, he commands the company. The second lieutenant is the same as the ensign in an infantry regiment, being the youngest commissioned officer in the company, and it is his duty to assist the first lieutenant.

**LIEUTENANT-General of Artillery**. See **Lieutenant-GENERAL of Artillery**.

**LIEUTENANT-Captain**. See **CAPTAIN**.

**LIEUTENANT of Engineers**. See **ENGINEER**.

**LIEUTENANT-General**. See **GENERAL, Lieutenant**.

In France they have also lieutenant-generals of their naval forces, who command immediately under the admirals.

In Holland they have a lieutenant-admiral, which is the same with what we call a vice-admiral.

**LIEUTENANT-General of the Ordnance**, is he who has the charge of the artillery, batteries, &c. under the master-general, or in his absence. This officer was first established in 1597. See **ORDNANCE**.

**LIEUTENANT-Colonel of Foot**. See **Lieutenant-COLONEL**.

The dragoons have also a lieutenant-colonel; but the horse have not, properly, any; the first captain of the regiment supplies the office.

**LIEUTENANT-Colonel of Horse**, is only the first captain of the regiment, who commands in the absence of the colonel, taking place of all other captains.

**LIEUTENANT of a Ship of War**, is the officer next in rank and power to the captain, in whose absence he is charged with the command of the ship, and also the execution of any orders which he may have received from the commanders relating to the king's service. The lieutenant, who commands the watch at sea, keeps a list of all the officers and men belonging to it, in order to muster it, and report to the captain the names of those who are absent from their duty. During the night-watch he occasionally visits the lower deck, or sends thither a proper officer to see that order is observed. He is always to be upon deck in his watch, to give orders for trimming the sails and superintending the navigation, and for preserving order; but he is never to change the ship's course without the captain's direction, unless it be to avoid an immediate danger. In time of battle he is to see that all the men are present at their quarters, to order and exhort them to perform their duty, and to inform the captain of any misbehaviour. The youngest lieutenant of the ship, who is also called lieutenant at arms, is, besides his common duty, to train the seamen to the use of small arms, and in time of battle to attend and direct them for this purpose.

**LIEUTENANT de Roy**, the deputy governor of all strong towns in France before the revolution, who is a check upon the governor, and commands in his absence.

**LIEUTENANT Reformed**, is he whose company or troop is broke or disbanded, but continued in whole or half-pay, and still preserves his right of seniority and rank in the army.

**LIFE**, in *Physiology*, is the peculiar condition or mode of existence of living beings. Surrounding matter we observe to be divided into two great classes, living and dead: the latter is subject to physical laws, which the former also obeys in a great degree: it exhibits also physical properties, which we find equally in the latter. But living bodies are endowed moreover with a set of properties altogether different from these, and contrasting with them in a very remarkable way; these are the vital properties, powers, faculties, or forces. They animate living matter so long as it continues alive, and are the source of the various phenomena which constitute the functions of the living animal body, and which distinguish its history from that of dead matter. The study of life, then, which is the object of the science of physiology, as organization is of anatomy, includes an inquiry into the properties that characterize living matter, and an investigation of the functions which the various organs, by virtue of these properties, are enabled to execute.

As the animals, which belong to the different classes of natural history, differ greatly in the number of functions, which they can execute, as we have every gradation from that of the greatest simplicity, to as great a complication in structure and functions; life includes very different notions in the different instances. Our view would be very imperfect if we observed it only in one example; we shall, therefore, extend our survey in a very general manner, through all the orders of animals. For this purpose we shall avail ourselves of the very excellent introductory lecture to the *Leçons d'Anatomie comparée* of Cuvier, which exhibits a luminous and philosophical view of life in general, and of its principal modifications in the different classes of animals. We shall subjoin a general account of

Bichat's division of the animal functions, and of the vital properties by which they are executed, from his *Recherches sur la Vie et la Mort*.

The idea of *life* is one of those general and obscure ideas produced in us by observing a certain series of phenomena possessing mutual relations, and succeeding each other in a constant order. We know not indeed the nature of the link that unites these phenomena, but we are sensible that a connection must exist; and this conviction is sufficient to induce us to give it a name, which the vulgar are apt to regard as the sign of a particular principle, though in fact that name can only indicate the totality of the phenomena which have occasioned its formation.

Thus, as the human body, and the bodies of several other animals resembling it, appear to resist, during a certain time, the laws which govern inanimate bodies, and even to act on all around them in a manner entirely contrary to those laws, we employ the terms *life* and *vital force* to designate what are at least apparent exceptions to general laws. It is therefore by determining exactly in what the exceptions consist, that we shall fix the meaning of those terms. For this purpose, let us consider living bodies in their active and passive relations with the rest of nature.

For example, let us contemplate a female in the prime of youth and health. That elegant voluptuous form, that graceful flexibility of motion, that gentle warmth, those cheeks crimsoned with the roses of delight, those brilliant eyes, darting rays of love, or sparkling with the fire of genius, that countenance, enlivened by sallies of wit, or animated by the glow of passion, seem all united to form a most fascinating being. A moment is sufficient to destroy this illusion. Motion and sense often cease without any apparent cause. The body loses its heat; the muscles become flaccid, and the angular prominences of the bones appear; the lustre of the eye is gone; the cheeks and lips are livid. These, however, are but preludes of changes still more horrible. The flesh becomes successively blue, green, and black: it attracts humidity, and while one portion evaporates in infectious emanations, another dissolves into a putrid fæces, which is also speedily dissipated. In a word, after a few short days there remains only a small number of earthy and saline principles. The other elements are dispersed in air, and in water, to enter again into new combinations.

It is evident that this separation is the natural effect of the action of the air, humidity, and heat,—in a word, of external matter upon the dead body; and that it has its cause in the elective attraction of those different agents for the elements of which the body is composed. That body, however, was equally surrounded by those agents while living, their affinities with its molecules were the same, and the latter would have yielded in the same manner during life, had not their cohesion been preserved by a power superior to that of those affinities, and which never ceased to act until the moment of death.

Of all the phenomena, the particular ideas of which enter into the general idea of life, this is what at first sight appears to constitute its essence, since we can form no conception of life without it, and since it evidently exists without interruption until the instant of dissolution.

But a further study of any living body convinces us, that the power which preserves the union of the molecule, notwithstanding the external forces which tend to separate them, does not confine its activity to this tranquil operation, and that the sphere of its action extends beyond the bounds of the living body itself. At least it does not appear that this power differs from that which attracts new molecule

molecule to deposit them between those that already exist : and this action of the living body, in attracting the surrounding molecule, is not less constant than that which it exercises in retaining its own ; for, besides that the absorption of the alimentary matter, its conversion into nutritive fluid, and its subsequent transmission to all the parts of the body, experience no interruption, and continue from one repast to another ; another absorption constantly takes place at the external surface, and a third by the effect of respiration. The two latter are those only which exist in all living bodies which do not digest, that is to say, in all plants.

Living bodies, however, do not increase indefinitely. Nature has assigned to each limits which it cannot exceed. It follows, therefore, that they must lose, in one way, a great part of what they gain in another ; and indeed an attentive observation has convinced us, that transpiration, and a number of other causes, tend continually to diminish their substance.

This consideration must modify the notion which we at first formed from the principal phenomenon of life. Instead of a constant union in the molecule, we cannot avoid observing, that there is a continual circulation from the exterior to the interior, and from the interior to the exterior of bodies ; a circulation which, though uniformly preserved, is notwithstanding fixed within certain limits. Thus living bodies may be considered as a kind of receptacles, into which inert substances are successively thrown, in order to combine among themselves in various manners, maintain a certain place, and perform an action determined by the nature of the combinations they have formed ; and from which they escape in order to become again subject to the laws of inanimate nature.

It must be observed, however, that there is a difference, depending on age and health, in the proportion of the parts which enter into this kind of circulation, and those which abandon it ; and that the velocity of the motion usually varies according to the different conditions of each living body.

It appears, at the same time, that life is terminated by causes similar to those which interrupt all other known motions, and that the hardening of the fibres, and the obstruction of the vessels, render death the necessary consequence of life, as repose is of motion, even though the crisis were not accelerated by innumerable causes which are foreign to the living body.

This general and common motion of all the parts forms so peculiarly the essence of life, that the parts which are separated from a living body soon die, because they possess no motion of their own, and only participate in the general motion produced by their union. Thus, according to the expression of Kant, the reason of the mode of existence of each part of inanimate bodies belongs to itself, but in living bodies it resides in the whole.

The nature of life, as above described, being once well ascertained by the observation of the most constant of its effects, a wish would naturally arise to investigate its origin, and to inquire how it is communicated to the bodies it animates. Living bodies have, therefore, been traced to their infancy ; and it has been endeavoured to carry this examination as near as possible to the moment of their formation. But they have never been observed otherwise than completely formed, and already enjoying that vital force, and producing that circulatory motion, the first cause of which we are desirous of knowing. In fact, however feeble and minute the parts of an embryo, or of the seed of a plant, may be at the moment we are first capable of perceiving them, they

then enjoy a real life, and possess the germ of all the phenomena which that life may afterwards develop. These observations, extended to all the classes of living bodies, lead to this general fact, that there are none of *those bodies* which have not heretofore formed parts of bodies similar to themselves, from which they have been detached. All have participated in the existence of other living bodies, before they exercised the functions of life by themselves ; and it was even by means of the vital force of the bodies to which they formerly belonged, that they were enabled to develop themselves so completely as to become capable of enjoying separate vitality ; for though the particular action of copulation is necessary for the production of a number of species, many are produced without it ; copulation, therefore, is only a circumstance belonging to certain cases, and does not change the essential nature of generation. It appears then that the motion proper to living bodies has really its origin in that of their parents. It is from them they have received the vital impulse ; and hence it is evident, that, in the actual state of things, life proceeds only from life, and that there exists no other except that which has been transmitted from one living body to another by an uninterrupted succession.

Unable to ascend to the origin of living bodies, there remains then within our reach no source of information respecting the real nature of the powers which animate them, except the examination of the composition of those bodies, that is to say, of their texture, and the union of their elements : for, though it may be truly said, that this texture, and this union are in some manner the result of the action of the vital impulse which has given them being, and which maintains them ; it is also evident, that in themselves this impulse can have its source and foundation : and if the first union of the chemical and mechanical elements of any living body has been effected by the vital force of the body from which it descended, we ought to find in it a similar power, and also the causes of that power, since it has to exercise a like action in favour of the bodies which are to descend from it.

But this composition of living bodies is too imperfectly known to enable us to deduce clearly from it the effects they exhibit. We observe, in general, that they are composed of fibres or laminae, forming altogether a series of reticulated substances more or less compact, which form the bases of all their solids, as well of those that are maffy, as of those that present the appearance of laminae and filaments. We are acquainted with the form, the confidence, and the position of the larger of those solids ; the ramifications of the most considerable of their vessels, and the course of the fluids they contain : but their more minute branches, and their more secret texture, cannot be traced by our instruments. We likewise know the chemical characters of the most apparent of the different fluids and concrete substances : we can even decompose them to a certain point. This investigation, however, is not only imperfect, since we cannot recombine them, but the phenomena indicate, that there must exist several other fluids which we have not yet been able to discover.

The efforts hitherto made by naturalists to prove a connection between the phenomena of living bodies and the general laws of nature, have doubtless been unsuccessful. It would, however, be wrong, on that account, to conclude that those phenomena are absolutely of a different kind ; but, on the other hand, there would be much temerity in refusing this talk, while our knowledge of the bodies in which the phenomena appear is so limited. We should be able to give only an empirical exposition, instead of a  
rational

rational system. All our labours on organic economy must therefore be confined to its history.

If, however, our knowledge of the composition of living bodies be not sufficient for the explanation of the phenomena they exhibit, we may at least employ it in recognizing those bodies when out of a state of action, and in distinguishing their remains long after death; for we find in no inert body that fibrous or cellular texture, nor that multiplicity of volatile elements which form the characters of organization and organized bodies, whether in those that are alive, or in those that have lived.

We know that inert solids are composed only of polyatomic molecules, which attract each other by their sides, and never move except to separate—that they are resolvable into a very small number of elementary substances—that they are formed of the combination of those substances, and the accumulation of those molecules—that they grow only by the juxtaposition of new molecules, the strata of which envelope the preceding mass—and that they are destroyed only by some mechanical agent separating their parts, or some chemical agent altering their combinations; but organized bodies, which are tissues of fibres and laminae, and have their interstices filled with fluids, resolve almost entirely into volatile substances, are produced by bodies similar to themselves, from which they do not separate until they are sufficiently developed to act by their own force; constantly assimilate foreign substances, and deposit them between their particles; grow by an internal power, and finally perish by that internal principle, or by the effect of life itself.

Origin by *generation*, growth by *nutrition*, termination by *death*, are the general and common characteristics of all organized bodies: if, however, there are bodies which perform only these functions, and those which are subsidiary to them, and possess only the organs necessary for such operations, there is a great number of others which perform particular functions, that not only require appropriate organs, but necessarily modify the manner in which the general functions are performed, and the organs proper to those functions.

Among the less general faculties which indicate organization, but which are not the necessary consequences of it, the faculty of sensation, and that of voluntary motion, in whole or in part, are the most remarkable, and those which have the greatest influence on the other functions.

We are conscious that these faculties exist in ourselves, and we attribute them, by analogy, and from their apparent existence, to a number of other beings, whom we therefore name *animated beings*, or, using a single word, *animals*.

It appears that these two faculties are necessarily connected, the idea of *sensation* is even included in that of *voluntary motion*; for we cannot conceive volition without desire, and unaccompanied by the sentiment of pleasure or pain. There may indeed exist inanimate bodies, that manifest external motion produced by an internal principle; but their movements are not of the same nature as those which constitute the functions essential to life, and do not merit the name of voluntary.

On the other hand, the bounty which nature displays in all her productions, does not permit us to believe that she has deprived beings susceptible of sensation, that is to say, of pleasure and pain—of the power, in a certain degree, of avoiding the one and pursuing the other. Among the misfortunes which afflict our species, one of the most painful is the situation of a man of courage withheld by a superior power from resisting oppression; and the poetic fictions best calculated to excite compassion, are those which represent sentient beings inclosed within immovable bodies. The

sighs of Clorinda issuing, with her blood, from the trunk of a cypress, would arrest the fury of the most savage of mortals. *La Gerusalemme Liberata*, canto xiii.

But, independently of the chain which connects the two faculties, and the double system of organs they require, they are accompanied by several modifications in those faculties which are common to all organized bodies: these modifications, joined to the two first mentioned faculties, are what more particularly constitute the nature of animals.

With respect to nutrition, for example, vegetables, which are attached to the soil, absorb immediately, by their roots, all the nutritive parts of the fluids which they imbibe. These roots are subdivided to extreme minuteness; they penetrate into the smallest interstices, and proceed, if it may be so said, to seek at a distance food for the plant to which they belong. Their action is tranquil and uniform, and never is interrupted except when deprived by drought of the juices which they require.

Animals, on the contrary, which are not fixed, and which frequently change their place, can transport with themselves a portion of the substances necessary for their nutrition: they have therefore received an internal cavity, into which they deposit the matters destined for their aliment; and the inward surfaces of this cavity are furnished with innumerable absorbing pores or vessels, which, according to the energetic expression of Boerhaave, are real *internal roots*: the magnitude of this cavity, in a number of animals, permits them to introduce solid substances into it. It was necessary, then, that they should have instruments for dividing those substances, and liquors for dissolving them. In a word, with such animals nutrition does not immediately commence upon the absorption of the substances which the soil or the atmosphere furnish them. It is necessarily preceded by a vast number of preparatory operations, the whole of which constitute *digestion*. See DIGESTION.

Thus, it appears, that digestion is a function of a secondary order, proper to animals, the existence of which, as well as of the alimentary canal in which it is performed, is rendered necessary by the faculty they possess of voluntary motion; but this is not the only consequence of that faculty.

The faculties of vegetables being very few, their organization is very simple; almost all their parts are composed of fibres, which are either parallel, or diverge very little. Further, their fixed position admits, that the general motion of their nutritive fluid may be preserved by simple external agents. It appears that it proceeds upwards, by the effect of the suction of their spongy or capillary texture, and the evaporation which takes place at their top, and that its motion in that direction is the more rapid in proportion as the evaporation is great. It appears also that the motion of this fluid may even become retrograde, when it ceases to flow in its usual course, or changes into absorption by the coolness and humidity of the air.

It is not only necessary that animals destined continually to change their place of existence, and to live in all kinds of situations and temperatures, should possess within themselves an active principle of motion for their nutritive fluid; but their more numerous and more developed faculties requiring a much greater complication of organs, their various parts being differently formed, often at a distance from each other, and even capable of changing their respective positions and directions, means more powerful, and otherwise disposed than in vegetables, are necessary for transmitting this fluid through such a multiplicity of intricate windings.

In the greater part of animals, therefore, this fluid is contained in innumerable canals, which are the ramifications of two trunks communicating with each other, in such a man-

ner, that the one receives in its roots the fluid which the other has pushed into its branches, and carries it back to the centre, to be again driven forward from that point.

Where the two great trunks communicate, the heart is placed: it is merely an organ, the contractions of which drive this fluid forward with great force into all the ramifications of the arterial trunk. It has two orifices, the valves of which are so disposed that the fluid contained in the whole vascular system can proceed in no other manner than in that we have pointed out; that is to say, from the heart towards the other parts of the body by the *arteries*, and from those parts back to the heart by the *veins*. See CIRCULATION and HEART.

In this movement, by rotation, consists the circulation of the blood, which is another function of a secondary order, proper to animals, and of which the heart is the principal agent and the regulator; but this function is not so necessarily connected with the faculties of sensation and motion as the function of digestion is; for two numerous classes of animals are completely deprived of circulation, and are nourished like vegetables, by simply imbibing a fluid which is prepared in the intestinal canal.

In the animals that have a circulation, the blood appears to be merely a vehicle which is continually receiving from the alimentary canal, from the external surface of the body, and from the lungs, different substances, which are intimately incorporated with it, and continually furnishing substances to all the different parts of the body, for their preservation and growth. In its passage through the extremities of the arteries the blood effects the real nutrition of the parts; at the same time it changes its nature and its colour: and it is only by the accession of the different substances, which have just been pointed out, that the venous blood is rendered proper for nutrition, or, in one word, becomes *arterial* blood.

It is by particular vessels, called *lymphatics*, that the venous blood receives the substances with which the skin and the alimentary canal supply it. By them, also, it receives even the residuum of nutrition, and the particles which are detached from different parts, to be carried out of the body by various excretions. See ABSORBENTS and ABSORPTION.

With respect to the lungs, the air that penetrates into them produces, with the venous blood, a kind of combustion, which appears to be necessary to the existence of all organized bodies: for it takes place in them all, though in very different ways. See RESPIRATION.

Vegetables, and animals which have no circulation, respire throughout the whole of their surface, or by vessels which introduce the air at different points into the interior of their bodies. No animals respire by a particular organ, except those that have a real circulation, because, in them, the blood coming from one common source, the heart, to which it constantly returns, the vessels that contain it are so disposed, that it cannot arrive at the other parts until it has passed through the lungs. This, however, cannot take place in vegetables, or in those animals in which this fluid is every where diffused in an uniform manner, without being contained in vessels.

Hence it appears that pulmonary or bronchial respiration is a function of a third order, the existence of which depends on that of circulation, and that it is a remote consequence of those faculties that characterize animals.

Even the mode of generation in animals, at least as far as the fecundation of the ova is concerned, depends on their particular faculties; for the faculties they possess of moving and advancing towards each other, of desiring and enjoying,

has fitted them for tasting all the delights of love: while, with respect to the purely mechanical part, their spermatic fluid has no occasion for any envelope, and is capable of being transmitted directly to the ova; but in vegetables, which do not possess within themselves the power of directing this fluid, it was necessary that it should be enclosed in little capsules, which are susceptible of being transported by the winds, and which form what is called the *pollen* of the *stamina*. Thus, while animals, for the performance of most of their other functions, have, in consequence of faculties peculiar to themselves, received more complicated organs, they are enabled, by those characteristic faculties, to exercise the function of generation in a manner more simple than vegetables.

These examples show how much influence the faculties of sensation and motion, which animals possess in addition to those of vegetables, have over the organs of all the other faculties which are common to both these kinds of beings. The comparison which we shall hereafter make of the different orders of animals, will, in the same manner, demonstrate that the modifications of their principal functions exercise a similar influence on all the others:—such is the union and harmony which prevails in all the parts of living bodies.

We have thus described the principal functions which compose the animal economy. It is obvious that they may be divided into three distinct orders. There are some which, in constituting animals what they are, fit them for fulfilling the part that nature has assigned to them in the general arrangement of the universe,—in a word, which would be sufficient for their existence, if that existence were only momentary. These are the faculties of sensation and motion: the latter enables them to execute certain actions, and the former determines their choice of the particular actions they are capable of performing. Each animal may be considered as a partial machine, co-operating with all the other machines, the whole of which form the universe: the organs of motion are the wheels and levers, in short, all the passive parts; but the active principle, the spring which gives the impulse to every part, resides only in the sensitive faculty, without which the animal, plunged in a continual slumber, would be reduced to a state purely vegetative;—plants themselves, as Buffon has observed, may be called animals which sleep. These two functions form the first order, and are termed *animal functions*. But animal machines, unlike those we construct, possess an internal principle of preservation and reparation. This principle consists in the union of the different functions which serve to nourish the body, that is to say, *digestion, absorption, circulation, respiration, transpiration, and the excretions*. These form the second order, and are denominated *vital functions*.

Finally, the duration of each animal's life being determined according to its kind, *generation* is a function of a third order, by which the individuals that perish are replaced by others, and the existence of each species maintained. See FUNCTION.

Having considered these functions with respect to themselves, and to their reciprocal relations, we shall next examine the organs by which they are performed.

*General idea of the organs of which the animal body is composed.*—No part of the animal body is composed entirely of solid particles; they all yield fluids by expression, or lose them by excretion; and they all exhibit the appearance of an areolated or reticular texture.

The mechanical division of the solids conducts us, in the last result, to lamellæ, or filaments, which seem to be the elementary molecule. When the lamellæ are separate, and

interrupted by sensible vacancies, they form what is called cellulosity. This cellulosity not only envelopes and pervades the most dense parts, but it appears to form almost always their basis; for membranes consist only of a more compact cellulosity, the lamellæ of which are more closely approximated, and placed more exactly above each other, and are resolved into an ordinary cellulosity by maceration. (See *CELLULAR substance*, and *MEMBRANE, cellular*.) The vessels are merely membranes rounded into cylinders. All the soft parts of the body, the fibres excepted, seem to be an assemblage of vessels, differing from each other only according to the nature of the fluids they contain, by their number, their direction, and the structure of their coats.

The chemical analysis of these substances, solids as well as fluids, exhibits only a few principles, almost all of which are to be found in each of them, though in very different proportions. Some earths, some salts, phosphorus, carbon, azote, hydrogen, oxygen, a little sulphur, and a little iron, combined in a great variety of ways, produce different compositions, viz. gelatine, albumen, and fibrous matter, &c. which, uniting in their turn, form animal solids and fluids, such as we know them. But, distant as we are from a complete analysis, we see enough to convince us, not only that we alter these compositions by our experiments, but also that several of their principles entirely escape our instruments. For a more particular account of the elementary tissues, into which the body can be resolved, see the article *FIBRE*.

The general organ, by which we exercise the faculty of sensation, is the medullary substance. In all the animals in which we can distinguish it, that substance is divided into filaments, which arising from certain centres, distribute themselves over most parts of the body, where they appear to serve other purposes besides that of procuring sensations. The centres from which those nervous cords proceed, communicate with each other in a manner more or less intimate, and several of the filaments seem of no other use than to establish those communications.

A nerve, when touched by a foreign body, causes the sensation of pain, though its contact with the parts of the body which are naturally contiguous to it, produces no sensible effect in a state of health. The nerves, by which we discern external objects, are provided, at their extremities, with organs, each of which is disposed in a particular manner, and always possesses an admirable relation to the nature of the objects, a knowledge of which each of these senses is destined to convey to us. See *NERVE* and *BRAIN*.

The general organ of motion is the fleshy or muscular fibre. This fibre contracts itself by volition; but the will only exercises this power through the medium of the nerves. Every fleshy fibre receives a nervous filament; and the obedience of the fibre ceases, when the communication of that filament with the rest of the system is interrupted. Certain external agents, applied immediately to the fibre, likewise cause contraction; and they preserve their action upon it, even after the section of its nerve, or its total separation from the body, during a period which is longer or shorter in different species of animals. This faculty of the fibre is called its irritability. Does it in the latter case depend upon the portion of the nerve remaining in the fibre after its section, which always forms an essential part of it? Or is the influence of the will itself only a particular circumstance, and the effect of an irritating action of the nerve on a faculty inherent in the muscular fibre? Haller and his followers have adopted the latter opinion; but

every day seems to add to the probability of the opposite theory. See *MUSCLE*.

Be this as it may, all the internal parts of the body destined to produce a compression on the substances they contain, have their parietes furnished with fleshy fibres, and receive nervous filaments; such is the case with the bladder, the intestines, the heart, &c. But the principal use of these fibres is the formation of *muscle*. This is the name given to the bundles of fleshy fibres, the extremities of which are attached to the moveable parts of the animal body. When the fibres which compose the muscle shorten, the two points to which it is attached are brought towards each other: this is the sole means by which all the external motions of the body and the members, even those which are necessary for removing the body entirely from one place to another, are produced.

Animals that can only crawl have their muscles attached to different parts of their skin, on which they alternately produce dilatations and contractions, which are the only motions of which they are susceptible: but those which are capable of moving themselves by leaps or otherwise, either wholly or partially, have their muscles attached to hard parts placed externally or internally. Those parts perform the office of levers, and have points of support on each other, which are called their *articulations*.

All the hard parts taken together form the skeleton. When they are covered by the muscles, they receive the name of bone; when they cover muscles, they are denominated shell, crust, or scale, according to their degree of consistency. In both cases they always enclose viscera, and determine the exterior form of the body, and the proportions of its different parts.

The articulations are provided with as many muscles as are necessary for the different movements of which they are susceptible; each muscle moving the bone to which it is attached, in its proper direction. They may be regarded as the moving powers. Their force, the point of their insertion, and the length and weight of the parts attached to the lever they have to move, determine the velocity and the duration of the motion they are capable of producing. On these different circumstances depend the force of leaping, the extent of flight, the rapidity of running, and the prehensile power possessed by different species of animals; but, as we have already observed, all this organization would remain immovable, were it not animated by the nervous system.

The soft white substance which forms the essence of this system, is divided into filaments that approach each other, and unite in bundles, which contain more filaments in proportion as they are traced nearer to the common fasciculus of all the nerves, called the spinal marrow, the anterior extremity of which is joined to the brain, that is to say, to a medullary mass of more or less magnitude, and differently formed according to the various kinds of animals.

From the action of external bodies on our own, we perceive that the nerves affected by that action communicate with the common fasciculus, and that it communicates with the brain. A ligature or a rupture intercepts the physical communication, and destroys sensation.

The only sense which belongs generally to all animals, and which pervades almost the whole surface of the bodies of each of them, is that of feeling. It resides in the extremities of the nerves which are distributed to the skin, and makes us sensible of the resistance of bodies, and their temperature.

The other senses seem to be only modifications of this one,

one, but more exalted, and capable of receiving more delicate impressions. Every one knows that the other senses are seeing, which resides in the eye; hearing, which belongs to the ear; smelling, which is attached to the membranes within the nose; and tasting, the seat of which is in the surface of the tongue. These senses are almost always situated in the same extremity of the body which contains the brain, and which we call the head.

Light, the vibrations of the air, the volatile emanations which float in the atmosphere, and saline particles soluble in water, or saliva, are the substances which act on these four senses; and the organs, which transmit the action to the nerves, are appropriate to the nature of each. The eye presents transparent lenses to the light, which refract its rays. The ear offers membranes and fluids to the air, which receive its concussions. The nose inhales the air which is to go to the lungs, and seizes, in their passage, the odorous vapours it contains. Finally, the tongue is covered with spongy papillæ, which imbibe the savory liquids that are taken into the mouth.

By these means we obtain a knowledge of what passes around us: but the nervous system likewise makes us acquainted with a great deal of what passes within us. Independently of those internal pains which indicate some disorder in our organization, and the disagreeable state in which we are placed by hunger, thirst, and fatigue, it is in consequence of the operation of this system that we experience the agonies of fear, the emotions of pity, the delirium of love. Sensations of this last kind seem, however, to be rather the effects of the re-action of the nervous system, than immediate impressions; though, at the sight of any imminent danger, we hasten to avoid it before it appears that the mind has had time to act; and the same observation applies to the transports we feel on the presence of a beloved object, or to the tears we shed over the spectacle of suffering virtue. These effects of the nervous system are produced by numerous communications which particular nerves, called *sympathetics*, establish between different branches of the general trunk, by means of which the impressions are transmitted more rapidly than by the brain. The knots called *ganglia*, when they are considerable, are each a kind of secondary brain; and it is observable, that they are larger and more numerous in proportion as the principal brain is less.

The faculty of sensation, and that of contraction, the first of which, in most animals, is exclusively appropriated to the nervous substance, and the second to the fleshy part, appear to be equally diffused in all the parts of certain gelatinous animals, in which we cannot perceive either fibres or nerves.

It is by the means of these two faculties that animals feel, desire, and are enabled to provide for their wants. The most irresistible feeling of all is that of hunger, which constantly reminds the animal of the necessity of procuring new materials for its nutrition. This third function commences in the mouth, into which the aliments are taken, and, when they are solid, masticated and moistened with dissolving liquors; thence they traverse the alimentary canal, which is longer or shorter, and more or less convoluted and dilated in different animals, and the parietes of which are composed of several continued tunics, analogous to those which form the external teguments of the body.

The coats act in a mechanical manner, on the substances which they contain, by slight contractions of their fibres; and in a chemical manner, by the liquors which are poured out within them.

The first dilatation of the alimentary canal is called the *stomach*. There are sometimes several stomachs, or several

divisions of that organ; its parietes yield a liquid which reduces the aliments to a homogeneous pulp, during the time they remain in it. The remainder of the canal is more particularly called bowels or intestines. Independently of the juices, which the different coats of the bowels produce, there are some which are separated from the mass of the blood by glands, and which penetrate the intestinal canal by particular conduits. The most remarkable and the most general of these glands are the liver and the pancreas. The first, which secretes the bile, is always of a considerable size; and besides the effect of its liquid on the intestines, produces another very remarkable effect on the blood itself, from which it removes several principles. See *STOMACH, INTESTINES, LIVER, and PANCREAS*.

It is in the intestines that the aliments undergo that change which fits them for nutrition. The nutritive part is absorbed, during the act of digestion, either by the pores of the canal itself, in animals that have no circulation, or, in those that have, by very small vessels which conduct it into the general system of nutritive vessels. These small vessels are called *lymphatics*. They are very distinct from the veins, in animals whose structure most resembles that of man: in the more inferior animals they become gradually more like the veins, and cannot be distinguished from them in those which have white blood. The membranes which compose the lymphatic vessels and veins are thin, and without apparent fibres. Internally they are furnished with valves, all opening in the direction in which the fluid they convey has to flow, that is to say, towards the heart. The arteries, on the contrary, are strong and muscular, but have no valves; the vigorous impulse of the heart is sufficient to impels a constant direction on the blood they contain.

But the chyle, or the liquor produced by digestion, is not sufficient for renewing the venous blood, and rendering it fit for the nutrition of the different parts of the body. It is necessary that it should experience the contact of the air before it enters into the arterial system. This is effected by respiration. The organs of respiration, in animals which have blood-vessels, consist in a ramification of those vessels, which increases their surface to such a degree, that almost all parts of the fluid are separated from the surrounding element only by a very thin pellicle, which cannot obstruct its action. This ramification takes place on the surface of certain folds or lamellæ in aquatic animals, and on that of certain cells in aerial animals. In the first case the organ is denominated *branchie*, in the second *lungs*. In animals which have no vessels, the air reaches all parts of the body, and acts on the nutritive fluid at the same moment in which that fluid combines with the parts of the body which it is destined to nourish. This is the case with insects that have *tracheæ*. It will be easily conceived that there must be muscular organs, appropriated to each of those species of respiration, destined to attract or impel the ambient fluid towards the place where it has to act upon the blood. This office is performed by the ribs, the diaphragm, the muscles of the abdomen, the flaps of the gills, and several other parts, according to the nature of the animal. See *LUNG*.

The air cannot be employed in the formation of the voice, except in the animals that respire by cellular lungs, because it is in them only that it enters by a single and lengthened tube. At one or two parts of this tube there are membranes susceptible of tension, which vibrate when the air acts upon them, and thereby produce the various sounds which we call the *voice*. The animals which have no voice, properly so called, are not, however, deprived of the power of producing certain sounds, but they are produced in them by other means. See *LARYNX*.

The blood, on its passage into the organ of respiration, experiences a kind of combustion, which removes a part of its carbon, carrying it off under the form of carbonic acid, and which thereby augments the proportion of its other elements. The effect of this process on the respired air, is to deprive it of its oxygen, which is the only aeriform fluid that can be serviceable to respiration. Its effect on the blood is less known: we know that it heightens the colour of the blood in red-blooded animals, and gives it the power of exciting the heart to contraction. There is even reason to believe that it is this action of the air on the blood which gives, indirectly, to the fleshy fibres their contractile power. It is still necessary that the blood should lose several other principles: some are carried off by the kidneys, which secrete the urine, and which are found in all animals that have red blood. The matter which transpires through the pores of the skin, and the substances which pass through the intestinal canal, a great part of which are carried away with the excrements, relieve the blood of other principles. These three kinds of excretions, to a certain degree, supply the place of each other, and appear, therefore, to tend towards one common object. See INTEGUMENTS, KIDNEY, and RESPIRATION.

These are all the organs which constitute the animal; considered individually, and which are sufficient for its separate existence, while the object is not the multiplication of the species: such are the whole of the organs in the higher orders of animals. We shall see that, in proportion as we descend in the scale of being, they successively disappear, and that at last we shall find, in the lowest classes, only what is necessarily connected with the idea of an animal; that is, a sac, sensible, moveable, and capable of digesting.

Upon a close observation of the action of all these organs, it will appear, that all the operations which take place in the animal body, depend on the combination and decomposition of the fluids contained within it. To the animal process, by which one fluid is separated from another, or is formed from a part of the elements of one, mixed with a part of those of another, we give the name of *secretion*: this term, however, is usually confined to the changes which take place in different kinds of glands, that is to say, in bodies more or less thick, in which the blood-vessels, being infinitely subdivided, permit the liquid which the gland separates from the blood to transude from their extremities. (See GLAND.) But the animal economy exhibits a number of other transformations, or separations of humours, which equally merit this name. It cannot be supposed that the nerves act on the muscular fibres without producing a chemical change on the fluid that may be contained in the one, by the accession of that which the others may transmit, nor that external objects act upon the nerves otherwise than by producing a change of the same kind. The fluid contained in the nervous system must have been separated from the blood in the brain, and, in general, in all the medullary organs. The blood itself does not attain its state of perfection until a multitude of substances have been detached from it by the lungs, the kidneys, the liver, &c. and until after it has received a number of others which have been separated from the alimentary mass by the lacteal vessels: on the other hand, this mass is not capable of yielding chyle until it has in its turn received different liquors which have been secreted from blood by several organs; and the blood only nourishes the parts to which it is distributed, by the particles that are detached from its mass, while other particles are separated from these parts to return into the mass of the blood through the medium of the lymphatic vessels.

In a word, all the animal functions appear to reduce them-

selves to the transformation of fluids. In the manner in which these transformations are produced, the real secret of the admirable economy of animals consists, as health depends upon their perfection and regularity.

If we do not perceive this process in a manner sufficiently clear when the embryos of new individuals begin to develop themselves within or without the bodies of their mothers, we can at least discover it in the preparation of the male liquor, which, by its presence, excites or occasions that development in all the species in which copulation is necessary. This development takes place in the same manner as the ordinary growth. It, therefore, comes under the general rule.

The organs of generation, which alone remain to be noticed, are those which prepare the prolific liquor, and convey it to the ova, and those which are destined to contain and protect the embryo during its development. The first constitute the male, the second the female sex.

The testicles are the glands which secrete the seminal fluid; several other glands prepare liquors which mingle with it. The penis contains the seminal canal; it swells by the accumulation of blood when the nerves are excited by desire: by that means, it is rendered capable of penetrating the vagina, which leads to the matrix, or to the *oviductus*, and of conveying thither the fluid destined to vivify the ova. The oviduct or tube receives the ovum at the moment in which it is detached from the ovary; and conducts it without the animal if it be of the oviparous kind, or into the matrix if it be viviparous. The little embryo develops itself, and draws its nourishment, either from the body of its mother, by the absorption of a large tissue of vessels connected with those of its own body, or from an organized mass attached to it in the same manner, and which forms the yolk of the egg, or the *vitellus*. When the embryo attains a certain state, the matrix expels it; or it breaks the shell of the egg in which it is contained, and escapes from its prison. See GENERATION.

*View of the principal differences which animals exhibit in their several organs.*—It appears from the preceding account, that what is common to each kind of organs, considered in all animals, resolves itself into a very small compass, and that frequently they only resemble one another in the effects they produce. This is particularly obvious with respect to respiration, which is performed in the different classes of animals by organs so various, that their structure presents no common point of comparison. Those differences in the organs of the same kind are precisely the object of comparative anatomy; and the short exposition we are about to make, of the principal of these differences, may be regarded as a general view of this subject. We shall, therefore, return to each of the functions of which we have treated, and examine the different degrees of energy it possesses, and the particular means by which it is carried on in different animals.

The organs of motion present us at first sight with two important distinctions with respect to their situation. Sometimes the bones form an internal skeleton, articulated and covered by the muscles; sometimes there are no internal bones, but merely scales or shells which cover the skin, within which are the muscles: in other cases there is no hard part that can serve as a lever or point of support for the motions of the animal's body.

Animals of the first kind have the whole body supported by a strong pillar, formed of several bony pieces, placed one above the other, and called the spine of the back, or the vertebral column. They are, therefore, denominated *vertebral animals*. These are the mammalia, birds, reptiles, and fishes.

The animals without vertebrae are either entirely soft, or have

have their bodies and members enveloped in scales articulated on one another, or, finally, are enclosed in shells. These are the soft worms, insects, and the testacea.

It is by the greater or less perfection of certain parts that the animals of these different classes become susceptible of various kinds of motion.

The organs of sensation present considerable varieties;—some have a relation to the internal part of the nervous system, others to the external senses. The first give rise to three classes:—that of animals which have no apparent nervous system, and in which we discover neither vessels nor nerves; such are the zoophytes or the polypes:—that of animals in which there is only the brain above the alimentary canal, and which have all the remainder of the common bundle of nerves situated underneath, and contained in the same cavity with the other viscera; these are the mollusca, the crustacea, insects, and a part of the articulated worms: lastly, that of animals in which the common fasciculus of the nerves is situated entirely in the back above the alimentary tube, and enclosed in a canal which passes through the vertebral column; these are all the vertebral animals. Their ganglia are placed on the sides of their medullary cord, or dispersed in the large cavities. Among the invertebral animals there are some that have ganglia only in the large cavities, as the mollusca, and others, which have them all on the medullary cord itself, of which they appear to be swellings; these are the insects, and some articulated worms.

The differences in the external senses consist in their number, and in the degree of energy that belongs to each.

All vertebral animals possess the same senses as man.

Sight is wanting in the zoophytes, in several kinds of articulated worms, in several larvae of insects, and in the acephalous mollusca. Hearing does not exist, at least we have not yet discovered its organ, in some mollusca and insects. The other three senses, but particularly those of taste and touch, appear never to be wanting.

But each of these senses may vary considerably in the degree of its susceptibility, and the complication of its structure. The perfection of the sense of touch, for example, depends upon the delicacy of the external teguments, and on the division of the extremities that more particularly enjoy that sense; their formation rendering them capable of being applied more or less exactly to the bodies of which the animal wishes to acquire a knowledge. Above all, it is in the number and flexibility of the fingers and toes, and the smallness of the claws or nails, that the anatomist discovers important characters.

The eyes may be more or less moveable, more or less covered, and more or less numerous. The ears may be sunk within the cranium, or exposed outwardly; or they may be provided with an external trumpet, which collects the rays of sound. The membranes in which the sense of smelling resides, may be more or less extensive: those which are the seat of taste, may be more or less delicate and humid; but it is only by particularly considering each of these senses, that we can take a comprehensive view of the differences that exist in the various classes of animals.

The organs of digestion exhibit two important differences in their general dispositions. In certain animals, (in the greater part of zoophytes,) the intestines form a sac with only one aperture, which serves at once for the entrance of the aliments, and the issue of the excrements: all other animals have two distinct apertures, for those purposes, at the two extremities of the same canal; but the convolutions of this canal may be such as to remove these openings

to a greater or less distance from each other. Another difference which has much influence on the nature of the aliments appropriated to each species, is, that in certain animals the mouth is armed with teeth, or hard parts proper for grinding solid substances, while in others they do not exist. In the latter case, the animal can only swallow whole bodies if its mouth be large, or merely suck in fluids if its mouth be in the form of a tube. The structure of those teeth has itself much influence on the substances the animal can submit to mastication. The remainder of the alimentary canal varies also considerably in its structure, according to the different substances which the mouth conveys to it. On this likewise depend the length of the canal, and the number of stomachs, cæca, &c.

The chyle produced by the action of the digestive organs on the alimentary substances is transmitted to the various parts of the body in two different ways. It either simply transudes through the parietes of the intestinal canal, to bathe all the interior of the body, or it is absorbed by particular vessels which convey it into the mass of the blood. The first is the mode in which this operation is performed in zoophytes, and, probably, also in common insects, which appear to have no kind of vessels proper for circulation. As to the other animals, *viz.* the mollusca, and the vertebral animals, that have absorbent vessels, they exhibit two new differences. The latter have red blood, and the lymph and chyle white. Almost all the others have these two fluids of the same colour.

Vertebral animals differ among themselves, with regard to the colour of the chyle, which is white and opaque in the mammalia, and transparent, like the other lymph, in birds, reptiles, and fishes. The three last classes, therefore, have no conglobate glands in their chyloferous vessels, while they are very numerous in the first.

The circulation of the blood is accompanied with very important differences in its organs. In the first place, there are animals which have no circulation whatever, *viz.* insects and zoophytes: others have a double, and others a single circulation. We call that a double circulation in which no part of the venous blood can enter the arterial trunk, until it has passed through the organ of respiration, which is generally formed of the ramifications of two vessels; the one arterial, the other venous; each nearly as large, but not so long, as the two principal vessels of the body. Such is the circulation of man, of all mammalia, of birds, fishes, and a number of mollusca.

In the single circulation a great part of the venous blood re-enters the arteries without passing through the lung; because only one branch of the arterial trunk is expanded upon that organ; such is the circulation of the amphibia.

There are, besides, other differences in the hearts, or muscular organs, destined to give impulse to the blood. In the single circulation there is only one heart; but when the circulation is double, there is sometimes an organ at the base of the aorta, and also at that of the pulmonary artery. At other times it is at one of the two only.

In the one case, the two hearts, or rather the two ventricles, may be united, as in man, mammalia, and birds; or they may be separate, as in the cuttle fish.

Where there is only one ventricle, it may be placed at the base of the artery of the body, as in snails, and other mollusca; or at the base of the pulmonary artery, as in fishes.

The organs of respiration are likewise distinguished by a number of remarkable differences. When the element that acts on the blood is the atmospheric air, it penetrates even

into the interior of the respiratory organ; but when that element is water, it simply glides over a surface more or less multiplied.

The lamellæ which compose the organ, in the latter case, are called *branchiæ*. They are found in fishes, and in a number of mollusca: instead of lamellæ, we sometimes find fringes or tufts.

The air either enters the body by a single aperture, or by several. In the first case, which is that of all animals that have what is properly called lungs, the canal which receives the air divides into a number of branches, terminating in as many small cells, that are usually united into two masses, which the animal has the power of compressing or dilating at pleasure.

When there are several apertures, which is the case only with insects, the vessels that receive the air are ramified *ad infinitum*, and convey it to all parts of the body without exception. This we call respiration by tracheæ.

Lately, the zoophytes, if we except the echinodermata, have no apparent organ of respiration.

The organs of the voice present only two differences, which may be regarded as general. They depend on the position of the glottis, in which the sound is formed. In birds, it is at the lower part of the *trachea* or tube, which conducts the air, where it divides into its two branches to pass into the lungs. In quadrupeds and reptiles it is situated in the beginning of the trachea, at the root of the tongue.

Only these three classes have a glottis; but the other animals produce sounds by different means. Sometimes they employ the friction of certain elastic parts; sometimes they beat the air with other parts, or produce a rapid motion in certain portions of air, which they somewhere retain in their bodies.

Generation gives rise to varieties of two kinds. The one relates to the actions which occasion it, the other to the result.

In a small number of animals, belonging almost entirely to the class of zoophyta, generation is performed without copulation, and the young animal grows on the body of the parent, like a shoot on a tree: others only produce in consequence of copulation, and are therefore provided with two sexes; but these two sexes may be separate in different individuals, or united in the same. It is only in the mollusca and zoophyta that this last case occurs: all animals with vertebræ, and insects, have the sexes separate.

Hermaphrodite animals, such as the bivalve shell-fish, generate singly; in others, a reciprocal copulation takes place, each of the two individuals performing the functions of male and female: this is the case with the snails and other mollusca that crawl on the belly.

The produce of generation is either a bud which develops itself into an animal, remaining some time on the body from which it proceeds, and of which it forms as it were a branch; or it is a fetus, which unfolds itself in the uterus of its mother, to which it is connected by a plexus of vessels, and from which it comes forth alive; or, finally, it is a fetus included in a shell, with a substance adhering to it by vessels which it must absorb before it is discharged. These are the gemiparous, viviparous, and oviparous modes of generation.

The first occurs in some zoophytes, and in some articulated worms; the second in man and other mammalia only; the third is common to all other animals; and when their young come forth alive from the body of the mother, as is

the case with the viper, it is because the eggs are hatched in the oviduct.

Lately, if we consider the states through which the young animal is obliged to pass before it becomes, in its turn, capable of perpetuating its species, we again discover two principal differences. Some have at their birth the form which they will always preserve, with the exception of a few inconsiderable parts which have yet to disclose themselves, and to change their proportions: the others, on the contrary, have a form altogether different from their perfect state, and not only have to produce and unfold new parts, but must lose their old ones: these are the animals which undergo a metamorphosis. Hitherto this change has only been observed to take place among insects, and among the reptiles without scales, that is say, frogs and salamanders.

Such are the chief varieties which the organs belonging to the several functions of animals exhibit.

We have, however, yet to notice one very important variety which extends to several of these functions; it relates to the organs of secretion. In the four classes of vertebral animals, and in some mollusca, these organs are glands, or at least expansions of blood-vessels; the name of gland being particularly applied to them when they form masses of some thickness.

It is not so in insects, which, instead of secretory organs, have only tubes more or less long, which attract into the spongy texture of their parietes, that portion they have to separate from the mass of the nutritive fluid.

We are as yet little acquainted with the organs of secretion in zoophytes, if indeed they can be said to have any particular organ for that purpose.

*Division of life into the animal and organic.*—The preceding sketch has exhibited to us a general view of life; when we come to examine it more in detail, it offers to us two remarkable modifications. One is common to vegetables and animals, the other peculiar to the latter. Compare together two individuals, one taken from each of these kingdoms: one exists only within itself, has no other relations to surrounding objects than those of nutrition, is born, grows, and perishes, attached to the soil, which received its germ; the other joins to this internal life, which it possesses in a still higher degree, an external life, which it establishes numerous relations between it and the neighbouring objects, unites its existence to that of other beings, and draws it near to or removes it from them according to its wants or fears. We might say that the vegetable is the skeleton of the animal, and that, in order to form the latter, it was only necessary to clothe the skeleton with an apparatus of external organs, calculated to establish the necessary relations. Hence it follows that the functions of the animal form two very distinct classes. One of these consists of an habitual succession of assimilation and excretion; by which it is constantly transforming into its own substance the particles of other bodies, and then rejecting them, when they have become useless. By the other he perceives surrounding objects, reflects on his sensations, performs voluntary motions under their influence, and generally can communicate, by the voice, his pleasures or pains, his desires or fears. By the one he lives only within himself; by the other he carries his existence out of the sphere of his own body.

I call, says Bichat, the functions of the former class, taken altogether, the organic life, because all organized beings, whether vegetable or animal, enjoy it in a more or less marked degree, and because organic structure is the only condition

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condition necessary for its exercise. The assembled functions of the second class form the animal life, so named because it is the exclusive attribute of the animal kingdom.

Generation does not enter into the series of phenomena of these two lives, which relate entirely to the individual; while that function regards the species, and is consequently connected only in an indirect manner to most of the other functions. Its exercise does not begin until the others have been for a long time in action; and it is extinguished long before they cease. In most animals its periods of activity are separated by long intervals of entire inaction: and in man, where the remissions are less durable, its relations to the other functions are not more numerous.

Each of the lives is composed of two orders of functions, succeeding each other, and mutually connected. In the animal life, the first order takes place from the exterior of the body to the brain; and the second, from the latter organ to those of locomotion and the voice. Objects affect successively the senses, the nerves, and the brain. The first receive, the second transmit, and the last perceives that impression which constitutes a sensation. The animal is nearly passive in this first order of functions; he becomes active in the second, which results from the successive operations of the brain, where volition arises in consequence of sensation, of the nerves, which transmit this volition, and of the locomotive and vocal organs, which are the agents of its execution. A double movement of composition and decomposition exists also in the organic life. Hence the animal is not the same at one time as at another: his organization is unchanged, but the component elements are constantly varying. The order of functions, which assimilate to the animal nutritive substances, consists of digestion, circulation, respiration, and nutrition. All foreign matters undergo the influence of these four functions, before they belong to the elements of the body. After a certain time absorption removes them, and conveys them into the circulation, from which they are separated by the cutaneous or pulmonary exhalation, or by the various secretions. Thus absorption, circulation, exhalation, and secretion, form the second order of functions in the organic life; or the order opposed to assimilation. The circulating system is the common centre in the organic, as the brain is in the animal life. The blood consists of two parts; one, furnished principally by the food, affords the materials of nutrition; while the other, constituting the wreck or residue of all the organs, supplies with materials the secretions and external exhalations. Yet the latter functions sometimes convey out of the body the products of digestion where they have never been employed in nourishing the organs. This is exemplified in the urinary and cutaneous discharges consequent on copious drinking.

The most essential difference that appears to exist between the organs of the animal and those of the organic life, is the symmetry of the one and the irregularity of the other. This observation, indeed, does not apply to all animals; nor is it invariably true in man; but it holds good generally in the latter, and forms a striking general feature. Two globes exactly alike receive the impression of light. Sounds and odours have each their double organ. The median line is clearly marked on the tongue, and its two halves exactly resemble each other. This line is not very manifest in the skin. The nerves, which transmit impressions from the sensitive organs, are arranged in symmetrical pairs. And the brain, in which the impression is received, has a regular form; its double parts resemble each other on the opposite sides; and its single organs are all symmetrically divided by the median line into two exactly corresponding halves. The

nerves, which transmit our volitions from the brain to the agents of locomotion and the voice; and the locomotive organs, composed of a great part of the muscular system, of the bony system and its dependencies; and the larynx and its accessory organs; the double agents for the execution of volitions, have a symmetrical structure throughout.

The muscles and nerves, when they do not belong to the animal life, no longer exhibit this regularity of form. The heart, and the muscular coverings of the digestive viscera, prove this with respect to the muscles; and the great sympathetic nerve, every where employed in the internal life, clearly shews the irregularity in the nerves.

On surveying the parts concerned in the organic life, we shall find that an exactly opposite character is applicable to them. The stomach, the intestines, the spleen, liver, &c. are all irregularly formed in the digestive system. In the circulating apparatus, the heart, and the large vessels, such as the vena cava, the azygos, the vena portarum, &c. exhibit no trace of symmetry. Continual varieties are observed in the blood-vessels of the extremities, and the disposition of one side is often by no means the same with that of the other.

The respiratory apparatus, at the first glance, appears regular; but we find the two branches of the trachea dissimilar in size, length, and direction; the two lungs differing in size and in the number of their lobes, &c. The organs of exhalation and absorption, the serous membranes, the thoracic duct, and the right lymphatic trunk, as well as the other absorbing vessels, have every where an irregular distribution.

Among the glands we see the mucous follicles every where scattered irregularly. The pancreas and liver are out of all symmetry: the kidneys differ in position, size, &c.

It is apparent, from these considerations, that the organs of the animal life in man are essentially characterized by symmetry; while those of the internal life have the constant character of irregularity in their external forms.

It follows from this view, that the animal life is in a manner double; that its phenomena, executed at the same time on the two sides, form an independent system on each side, of which one may go on while the other ceases. This happens in those cases of paralysis called hemiplegia, where the animal life is annihilated on one side of the body, so that the individual has no relation to surrounding objects; while the preservation of sensation and motion on the other side give him all the usual powers. The median line in these cases accurately distinguishes the sound from the affected side.

In the organic life, on the contrary, all the parts conspire to form one system, so that the functions of one side cannot be interrupted without those of the other being affected. The liver on the left influences the state of the stomach on the right; if the colon cease to act on one side, that of the other cannot go on; the same cause that should arrest the circulation in the large venous trunks and the right side of the heart, would stop it also in the left side, and in the arteries, &c. Hence, if all the organs of the internal life on one side should have their functions stopped, those of the opposite side would necessarily remain inactive, and death must follow. This assertion, however, is general, and applies to the organic functions collectively; some of the organs are in fact double, and may supply each other's places, as the kidney and lung.

Bichat proceeds to point out the differences by which the animal and organic lives are distinguished when in a state of action. He observes that harmony is to the functions of the organs, what symmetry is to their conformation; it supposes

supposes a perfect equality of force and action, as symmetry indicates an exact analogy between the external form and the internal structure. It is a consequence of the law of symmetry; for two parts, essentially alike in their structure, cannot act differently. This reasoning would lead to the general position, that harmony is the character of the external functions, and discordance the attribute of the internal ones. He then enters at considerable length into a detailed consideration of this subject; but does not succeed in proving the point to the extent asserted.

A more important distinctive character of the two lives is drawn from the periodical intermissions of the external functions, and the uninterrupted continuity of the internal ones. Whatever suspends respiration and circulation, suspends and even annihilates life if it be continued. All the secretions go on uninterruptedly; if some periods of remission are observed, as in the bile and saliva, when digestion and mastication are not going on, these affect only the degree of activity and not the entire exercise of the function. Exhalation and absorption succeed each other without ceasing; nutrition is never inactive; the double motion, of composition and decomposition, from which it results, ends only with life.

In this concatenation of the organic phenomena, each function depends immediately on those which precede it. The circulation is the centre of the whole, and immediately connected with their exercise; if that is disturbed, the others languish; they cease if the blood no longer moves. Thus, the numerous wheels of a clock stop as soon as the pendulum, which sets them all in motion, is at rest. Not only is the general action of the organic life connected to the particular action of the heart, but each function is also separately connected to all the others. Without secretion there would be no digestion; without exhalation, no absorption; without digestion, no nutrition. We may, therefore, lay down as a general character of the organic functions, their continuity of action and mutual dependence on each other.

On the contrary, consider each organ of the animal life in the exercise of its functions; you will see constantly alternations of activity and repose, complete intermissions, and not remissions like what may be seen in some of the organic phenomena. Each sense, fatigued by a long continuance of sensations, becomes momentarily unfit for the reception of new ones. The ear is not excited by sounds, and the eye is closed against the light, merely because the respective functions have been exerted for some time. Fatigued by a long exercise of the perception, the imagination, memory, &c., the brain requires a suspension of action proportioned to the duration of the preceding activity, in order to recruit the powers, without which it could not again become active.

When a muscle has been contracted strongly, and for a considerable time, it cannot perform new contraction until after a certain interval of relaxation. Hence there are intermissions in the exertions of the locomotive and vocal powers.

This intermission in the animal life may be either partial or general. The former is seen when a particular organ has been a long time in exercise, the others remaining inactive; this organ then relaxes; it sleeps while the others are awake. Each animal function, therefore, is not in an immediate dependence on the others, as is the case with the organic functions. When the senses are closed against external objects, the action of the brain may still continue; memory, imagination, and reflection, are then often exercised. Locomotion and the voice may still remain; when the latter are interrupted, the func-

tions of the senses still go on. The animal can fatigue any part separately. Each, therefore, should have the power of resting in order to recruit its forces separately; this is the partial sleep of the organs. General sleep is the assemblage of these particular acts, and arises from the law which we have just illustrated.

*Differences of the organic and animal lives in respect to the vital properties.*—Physicians and physiologists, in their writings on the vital powers, have generally begun by searching for the principle on which they depend: they have wished to descend from the study of its nature to that of the phenomena, instead of ascending from the result of observation to the conclusions which theory may suggest. The soul of Stahl, the archæus of Van Helmont, the vital principle of Barthez, the *materia vitalis* of Hunter, with a long train of et ceteras, have been regarded in their turns as the single centres of all those actions which bear the character of vitality, and have successively afforded the bases on which all physiological explanations rest in the last resort. Each of these has been successively destroyed, and nothing has been preserved from their wrecks, except the facts afforded by experiment on the powers of sensation and motion. So narrow are the limits of the human understanding, that the knowledge of first causes seem placed for ever beyond our reach. The thick veil which covers them, envelops in its innumerable folds whoever attempts to break through it. In the study of nature, principles are certain general results of first causes, from which innumerable secondary results proceed; the art of discovering the connection between these primary and secondary results is the object of every judicious mind. To seek the connection between first causes and their general effects, is like walking blindfold through a road from which we may stray by a thousand paths.

Moreover, how are we interested in knowing these causes? is it necessary that we should understand the nature of light, oxygen, caloric, &c., in order to study the phenomena? Let us imitate, in the science of physiology, the examples of modern metaphysicians in their investigations of the intellectual phenomena; let us suppose the causes, and fix our attention entirely on the grand results.

We may observe in nature two classes of beings, two classes of properties, and two classes of sciences. Beings are either organic or inorganic, properties vital or not vital, and sciences physiological or physical. Animals and vegetables are organic; minerals, inorganic. Sensibility and contractility are vital properties; gravity, affinity, elasticity, are non-vital properties. Animal and vegetable physiology, and medicine, compose the physiological sciences; astronomy, chemistry, &c. &c. are physical sciences. These two classes of sciences relate merely to phenomena. Two others, relating to external and internal forms, consequently descriptive, correspond to them; these are botany, anatomy, zoology, for organic; mineralogy, &c. for inorganic bodies.

From these properties are derived all the phenomena in each class of sciences. Whatever we see in astronomy, hydraulics, dynamics, &c. must be ultimately referred through the concatenation of causes, to gravity, elasticity, &c. In the same way the vital properties are the mainspring at which we arrive, whatever phenomena we may be contemplating in respiration, digestion, secretion, inflammation, &c.

Each body possesses a certain number of properties, which especially characterize it, and by virtue of which it concurs in its own manner in the production of the phenomena, which are successively developed in the universe.

Observe

Observe surrounding objects; carry your view towards the most distant; use the telescope on the celestial bodies moving in space, or penetrate with the microscope into the world of those concealed from our view by their minuteness; you will constantly see inert bodies gravitating towards each other, living bodies also gravitating, but more-over feeling and performing a motion, which they owe only to themselves. These properties are so inherent in both, that we cannot conceive the bodies without them; to enjoy them and to exist mean the same thing. Suppose that they should be suddenly annihilated, all the phenomena of nature would instantly cease.

*Differences between the vital properties and the physical powers.*—The extent of this difference cannot fail to strike us on the first glance. The vital properties, constantly variable in their intensity, often pass with the greatest rapidity from the lowest to the highest degree of energy, are successively exalted and weakened in the different organs, and assume, under the influence of the slightest causes, a thousand different modifications. Sleep, exercising, rest, digestion, hunger, the passions, the effect of surrounding agents, &c. expose them at every instant to numerous revolutions. The others, on the contrary, constantly the same at all times, give rise to a series of phenomena always uniform. Compare sensibility to attraction; the latter is always in proportion to the mass of the body, in which it is observed, while the former is constantly changing in the same organ, in the same mass of matter.

The invariable nature of the laws which preside over the physical phenomena, enables us to submit to calculation all the sciences of which they are the objects; but the application of the mathematics to vital action can only lead to very general formulæ. The resistance experienced by a fluid in passing through a dead tube, the velocity of a projectile, &c. may be easily reduced to a fixed law; but to calculate with Borelli the power of a muscle, the velocity of the blood with Keil, the quantity of air entering the lungs with Irwine and Lavoisier, is like building on a moving-land an edifice which is solid in itself, but which quickly falls from the insecurity of its foundation.

From the circumstances just explained, the vital and physical phenomena derive respectively the characters of irregularity and uniformity. Inert fluids are known, when they have once been accurately analysed; but one, or even many examinations do not inform us of the nature of the living fluids. Chemical analyses give us, says Bichat, the anatomy (*Anatomic cadaverique*) of them; but their physiology consists in a knowledge of the innumerable variations which they exhibit according to the condition of the respective organs. The urine differs as it is voided after a meal or after sleep; in winter and in summer: the mere passage from a warm to a cold temperature alters its composition: it is not the same in the child, the adult, and the old man; in the male and in the female; in a quiet state of the mind and in the agitation of passion. Add to these differences the innumerable alterations produced by disease. These facts prove that the organs must undergo continual changes in their mode of action, to produce correspondent variations in the substances separated from the blood.

The science of organized bodies should be treated in a manner entirely different from those, which have inorganic matter for their object. We should employ a different language; since words transported from the physical sciences to the animal or vegetable economy constantly recal to us ideas not at all connected with the phenomena of that science. If, says Bichat, men had cultivated physiology before natural philosophy, instead of after it, we cannot doubt that

they would have discovered numerous applications of the former to the latter; that they would have described rivers flowing by the tonic action of their banks; crystals formed by an excitement of the reciprocal sensibilities of the particles; planets moving by their mutual irritation at great distances, &c. All this would appear to us very unreasonable, as we see gravity only at the bottom of these phenomena: it is more rational to have recourse to gravity, chemical affinity, and a language entirely founded on these fundamental data, in a science where their influence is most obscure? Natural philosophy, chemistry, &c. are connected, because the same laws regulate their phenomena: but a vast interval separates them from the science of organized bodies, because a wide difference exists between their laws and those of life. To call physiology the natural philosophy of animals can only lead to inaccurate notions: as well might we denominate astronomy the physiology of the stars.

*Difference between the vital properties and those which arise from organization.*—The properties of any living organ are of two kinds: the one immediately connected with life, beginning and ending with it, or rather forming its principle and essence; the other connected to it only indirectly, and appearing rather to depend on the organization, on the texture of the part.

Sensibility, and the power of contracting, are vital properties. Extensibility (the capability of being stretched), and the power of recovery, when the extension has ceased, are properties resulting from organization. The latter derive an increased energy from life; but they still remain in the organs when life has ceased, and decomposition is the only termination of their existence. We shall consider first the vital properties.

*Of the animal and organic sensibilities.*—The vital properties are reduced to those of perceiving or feeling (sensibility), and moving (contractility): each of these has a different character in the animal and organic lives. In the latter, sensibility is only the capability of receiving an impression: in the former, it is the capability of receiving an impression, with the additional power of referring it to a common centre, or consciousness. The stomach is sensible to the presence of food, the heart to that of the blood, and an excretory tube to the contact of its proper fluid: but this power ends in the organ itself. The organs of sense, the mucous surfaces at their origins, the nerves, &c. are sensible to the impressions of bodies which touch them, and moreover transmit these impressions to the brain, which is the general centre of the sensibilities of these various organs.

Thus we have an organic and an animal sensibility. On the former depend all the phenomena of digestion, circulation, secretion, exhalation, nutrition, &c. it is common to plants and animals; the zoophyte enjoys it as well as the most perfectly organized quadruped. From the latter flow the sensations, perception, and pleasure and pain, which modify them. The perfection of an animal is in proportion to the degree in which he enjoys this sensibility. It is not an attribute of vegetables.

The difference in these two modifications of sentient power is well marked in the mode of their termination in sudden deaths. The animal sensibility is immediately extinguished. There is no trace of this faculty left in the instant which succeeds a powerful concussion of the brain, a great hemorrhage, or an apoplexy: but the organic sensibility still subsists for a longer or shorter time. The lymphatics still absorb: the muscle quivers when pricked; the nails and hairs even seem to grow. All traces of this sensibility are not destroyed until after an interval, occasionally of considerable length.

Yet the essential nature of these two powers is probably the same. In many parts they are connected together and succeed each other in an insensible manner; as we may observe in the origins of the mucous membranes. We are sensible of the passage of the food through the mouth and the pharynx: this sensation becomes weaker in the beginning of the œsophagus, almost ceases in the middle of that tube, and disappears at its lower extremity and in the stomach, where the organic sensibility alone remains. The urinary and generative organs exhibit exactly the same phenomenon; there is animal sensibility near the skin; it gradually diminishes, and becomes at last organic in the interior of the organs.

Different stimuli, applied to the same organ, excite in it one or the other of these sensibilities. When ligaments are cut, or irritated by acids or alkalies, they do not transmit to the brain the strong impressions which they receive. But, if they are twisted, distended, or torn, acute pain is the consequence. The blood circulates in the arteries without our feeling it, but inject an extraneous fluid, and the cries of the animal shew that he is sensible to the impression.

We daily observe inflammation, by increasing the organic sensibility of a part, transform it into animal sensibility. Cartilages, serous membranes, &c. which, in their ordinary state, have only the obscure sensibility necessary for their nutrition, become endued, when inflamed, with animal sensibility, often more acute than that of the organs, in which it resides habitually. Inflammation accumulates the vital properties in a part, and thereby changes the organic into animal sensibility, which differs from it only in degree.

The distinction now explained does not arise from the nature of the faculty, which is every where the same; but is founded on the different modifications of which it is susceptible. The power is common to all organs, and forms their true vital character; but it is distributed in different proportions, and bestows a different mode of existence on each. In these varieties there is a certain measure, below which the excited organ alone receives and perceives the sensation; and above which it is transmitted to the brain.

Although each organ exhibits continual varieties in its sensibility, yet it seems to possess originally a certain proportion, to which it always returns after these alternations of augmentation and diminution. This proportion constitutes the proper life (*vita propria*) of each part, and fixes the nature of its relations to those bodies, which are foreign to it, but which often come in contact with it. The salivary, pancreatic, and biliary ducts, having a proportion of sensibility exactly analogous to the nature of the fluids which pass through them, admit those readily, but reject all others. The larynx refuses admission to every thing except the air. The excretory tubes are in contact, on the mucous surfaces, with various fluids that pass over these surfaces, but they never allow them admission. In the same way the lacteals, which open on the surface of the intestinal canal, absorb chyle only, and not the fluids which may be mixed with it. These relations do not exist only between the different proportions of sensibility in the organs, and the various animal fluids; they may also take place between external matter and the parts of the animal frame. The particular sensibility of the bladder and kidneys, and of the salivary glands, establishes the relations between these organs and cantharides, mercury, &c.

It may be enquired, why nature, in the distribution of the different proportions of sensibility, has bestowed this property only in inferior degrees on the internal organs, or those of the interior life, while she has so abundantly pro-

vided with it the external organs? why, consequently, each organ concerned in digestion, circulation, respiration, nutrition, absorption, does not transmit to the brain the impressions which it receives, while all the acts of the animal life suppose this transmission? The reason seems to be, that all the phenomena, which establish our relations to surrounding beings, must be, and are in effect, under the influence of the will, while those, which are subservient to the purposes of assimilation, ought to be exempt from that influence. To make a phenomenon dependent on the will, we must be conscious of it: to exempt it from the influence of that power, this consciousness must not exist.

*Of the animal and organic contractilities.*—Contraction is the most common form of motion in the animal organs. Some indeed move by dilatation, as the iris, corpus cavernosum, &c.; but we know as yet so little of this kind of motion, that we shall confine our remarks entirely to the former.

Spontaneous motion, a faculty inherent in living bodies, presents, like sensibility, two great modifications distinct from each other, as we observe it in the phenomena of the two lives: these are the animal and the organic contractility. The former, subject to the will, has its origin in the brain, ceases to exist when the organs no longer communicate with the brain, and participates in all the affections of that part. It resides exclusively in the voluntary muscles, and predisposes over the function of locomotion and the other movements, and the voice. The latter, not dependent on any common centre, has its origin in the part, is not connected with any voluntary acts, and produces the phenomena of digestion, circulation, secretion, &c. Like the corresponding sensibilities, they are essentially distinguished in violent deaths, which suddenly annihilate the animal contractility, allowing the organic still to exert itself for a longer or shorter time. The same difference is observed in apoplexy, which so much resembles death: the animal contractility is entirely suspended, the organic still continuing active. In paralysis also, voluntary motion is destroyed, while the organic movements still go on.

These two kinds of contractility are connected to their corresponding species of sensibility. The sensations produced by external objects bring the animal contractility into exercise: and before the organic contraction of the heart takes place, its sensibility has been excited by the contact of blood.

Yet the connection is not the same in the two cases. The animal sensibility may be excited, without the analogous contractility being necessarily brought into action: but the two other powers are never separately exercised. The excretory tubes immediately re-act when the secreted fluids are brought into contact with them: the arrival of blood in the heart is necessarily followed by its contraction. This conjunction is so constant, that authors have included both powers in one name. Irritability designates both the sensation excited by the contact of any body, and the contraction of the organ when it re-acts.

There is a very simple reason for this difference. In the organic life nothing intervenes between the two faculties in their exercise; the same organ is the point at which the sensation terminates and the contraction begins. In the animal life, on the contrary, the two acts are separated by middle functions, those of the nerves and brain, which, if they are not exerted, interrupt the communication. In the same way we explain this further difference; *viz.* that there is always a strict proportion between the sensation and the contraction in the organic life, while they may be separately exalted or diminished in the animal.

*Two varieties of the organic contractility.*—The animal contractility

tractility is always nearly the same, in whatever part it may exist; but the organic displays two essential modifications, which might seem to indicate a difference of nature, although there is only a diversity of external appearance. Sometimes it may be observed very distinctly, while, on other occasions, although it really exists, inspection alone cannot appreciate it.

Sensible organic contractility may be seen in the heart, stomach, intestines, bladder, &c.: its action is exerted on the animal fluids in considerable masses.

It is by virtue of the insensible organic contractility, that the excretory tubes act on their respective fluids, the secretory organs on the blood which they receive, all parts that are nourished on their nutritive juices, the lymphatics on the substances applied to these orifices, &c. Whenever the fluids exit in small masses, where they are minutely divided, this second kind of contractility is developed.

We may illustrate the difference between them, by comparing one to the attraction, which is exerted between large masses of matter, and the other to the chemical affinities, which take place between the component particles of an aggregate. Barthez compares them to the motions of the hands of a watch: that, which marks seconds, moves round the circumference in a very obvious manner; the hour hand moves also, although we cannot perceive its motion.

The sensible organic contractility corresponds nearly to what has been called irritability; the other to the tonic power, or tonicity. These two words are objectionable, because they indicate a diversity of nature in the two properties. The common term which we employ, designates their general character, that of belonging to the internal life, and of being independent of the will; while the additional epithet expresses the peculiar attribute of each. This view of the matter is confirmed by the fact, that the two properties are connected by insensible gradations. Between the obscure, but real contractility necessary for the nutrition of the hair, nails, &c. and that which we see exerted in the motions of the intestines, stomach, &c., there are many shades which form the transition; such as the motions of the dartos, of the arteries, of some parts of the skin.

The circulation will serve to give us an idea of the gradual transition from one to the other kind of organic contractility. In the heart and large vessels, this function is regulated by the sensible kind; it becomes less and less apparent, in proportion as the diameter of the vessels diminishes; and it is lastly insensible in the capillaries where tonicity alone is observable.

To consider, with most authors, irritability as a property exclusively belonging to muscles, and constituting a character by which they are distinguished from other organs, and to express this property by a name indicating this exclusive feat, is taking a confined and erroneous view of the matter. The muscles undoubtedly occupy the first rank in this respect; they possess the greatest share of organic contractility. But every living organ re-acts, like them, though in a less apparent manner, on stimuli artificially applied, or on the fluids which it receives, and which bring to it the materials of secretion, nutrition, exhalation, or absorption.

Hence nothing can be more uncertain than the rule commonly adopted for deciding whether a part be or not of a muscular nature; a rule which consists in examining whether it contracts under the action of natural or artificial stimuli. From this mode of judging, a muscular coat has been assigned to the arteries, although their organization is throughout unlike that of the muscles; the uterus has been pronounced to be muscular, although there are great dif-

ferences between it and any muscles; and a muscular texture has been admitted in the dartos, iris, &c.

This faculty of contraction, like sensibility, is unequally distributed in the organs; and these differences, like those of sensibility, appear to be only differences in degree.

If we were to designate any kind of contraction in the muscles by a particular term, it would be their animal, rather than organic contractility; since they alone, of all parts in the body, move under the influence of the brain. This property is foreign to their tissue, and is derived entirely from the latter organ.

The two kinds of contractility cannot be changed, like the two species of sensibility. The organic is never transformed into animal; however its intensity may be increased, it is still of the same nature. The stomach and intestines are often so susceptible, that the slightest cause will produce violent motions; but these are never influenced by the brain.

*The extensibility and contractility arising from organization.*—These properties depend entirely on the organic arrangement of the parts of the frame. They succeed and are connected to each other, and are in a state of mutual dependence, like the vital phenomena of sensibility and contractility.

The extensibility of tissue, or the power of elongation beyond the ordinary state, from a foreign impulse, belongs in a very sensible manner to a great number of organs. The extensor muscles are remarkably lengthened where the limbs are bent to the greatest degree; the skin gives way and is stretched to envelop tumours; aponeuroses are distended by fluids accumulated under them, as in ascites and pregnancy. The mucous and serous membranes present analogous phenomena. The fibrous membranes and even the bones are susceptible of this distention; as, for instance, the dura mater, cranium and pericranium in hydrocephalus, the extremities and middle of the long bones in the various affections of those organs; the kidneys, brain, and liver, in abscesses of their interior, the spleen and lung when distended with blood, the ligaments in hydrops articuli; in a word, all organs, under a thousand circumstances, offer to us innumerable proofs of this property, which is inherent in their tissue, but not dependent on life. It subsists, as long as the organic structure remains, even for a long time after life has become extinct. Putrefaction, decomposition, and whatever affects the organic tissue, are the only causes that destroy the exercise of this property, in which the organs are always passive, and experience a mechanical influence from the various bodies which act on them.

We may draw out a scale of extensibility for the different organs. At the top are placed those which have the most softness in the arrangement of their fibres, as the muscles, skin, cellular tissue, &c.: at the bottom those characterized by considerable density, as the bones, cartilages, tendons, nails, &c.

A particular mode of contractility corresponds to this extensibility; it may be called the contractility of tissue, or contractility through the cessation of extension. For its exertion in any organ, it is only necessary that the extension should cease. Ordinarily, most of our organs are maintained in a certain state of tension by particular causes; the locomotive muscles by their antagonists; the hollow muscles, by the various substances which they enclose; the vessels by the fluids which circulate in them; the skin of one part, by that of the neighbouring organs; the alveoli of the jaws by the teeth, &c. Now, if any of these causes cease to act, contraction immediately takes place; divide a muscle, and its

antagonist will be shortened; empty a hollow muscular organ, and it will contract; prevent an artery from receiving blood, and it will be converted into a ligament; cut the skin, and the edges of the incision will be drawn asunder; remove a tooth, and the socket will be obliterated.

In all these cases contraction follows the cessation of a natural extension; in other instances it is the consequence of the cessation of an unnatural extension. Thus the abdomen is reduced after parturition or paracentesis; the cellular tissue after the opening of an abscess; the tunica vaginalis after the operation for hydrocele; the skin of the scrotum after the removal of a large diseased testicle; and aneurismal sacs after the evacuation of the contained fluid.

This kind of contractility is perfectly independent of life; like the extensibility, it is connected only to the tissue or organic arrangement of parts; but the vital powers bestow on it increased energy; thus a divided muscle retracts much less in the dead than in the living state. It terminates only by the disorganization of the parts from decomposition, &c., and not by the annihilation of their vital properties.

Most authors, as Haller, Blumenbach, Barthez, &c., have confounded the phenomena of this contractility with those of the organic insensible kind, or tonicity; they refer the reduction of the abdomen after its distention, the retraction of the divided skin, and the corrugation of the scrotum by cold, and the crispation of parts by certain poisons, slyptics, &c. to the same principle. The two former phenomena belong to the contractility of tissue, which never supposes the application of irritants; the latter to tonicity, which is never exerted without their influence.

In order to render the distinctions, which we have made on this subject, more clear, let us select for observation an organ in which all the kinds of contractility are united; a voluntary muscle for example. This muscle acts, first, through the influence of the nerves, which it derives from the brain; this is the animal contractility; 2dly, by the application of a chemical or physical stimulus, which produces in it a general movement analogous to those which naturally belong to the heart and other involuntary muscles; this is the organic sensible contractility or irritability; 3dly, by the arrival of fluids, which convey the materials of nutrition to all its parts, and which excite motion in every fibre and particle,—a motion indispensable to the function of nutrition, as it is in the glands to secretion, in the lymphatics to ab-

sorption, &c.; this is the insensible organic contractility or tonicity; 4thly, by the transverse section of its substance, producing retraction of the divided ends towards their points of insertion; this is the contractility of tissue. Each of these properties may be separately destroyed in a muscle; divide its nerves and the animal contractility ceases, although the two organic kinds still subsist. Apply opium to it, and stimuli will no longer excite it to motion, although the tonic movements determined by the contact of the blood still remain. Kill the animal, or intercept all the vessels which go to the limb, and the tonic powers will be destroyed, leaving only the contractility of tissue, which does not cease until gangrene or putrefaction, the consequences of destroyed vital action, appear.

This example will enable us to appreciate the different kinds of contractility in organs, where they exist in smaller number than in the voluntary muscles, as in the heart or intestines, which have all the kinds except the animal; in the white organs, as the tendons, aponeuroses, bones, &c., where the insensible organic contractility and that of tissue only are found. In general, the two latter belong to all organs, the former belonging exclusively to some particular ones. We may therefore select tonicity, or insensible organic contractility, as the general character of all living parts; and the contractility of tissue as the common attribute of all parts, whether living or dead, which are organically composed. The latter property, like the extensibility of tissue, to which it corresponds, has its different degrees; the muscles, skin, cellular substance, &c. on one part, and the tendons, aponeuroses, and bones, on the other, form the two extremes of the scale.

It will be easily seen, from what we have just said, that in the contractility of any organ two things are to be considered; viz. the power and the cause which brings that power into exercise. The power or the contractility is always the same, connected to, and inherent in the organ; but the cause which determines its exercise varies greatly, and hence the various kinds of contraction. Consequently, the distinctive epithets should be applied rather to the contraction, which expresses the effect produced, than to the contractility which indicates the principle or cause.

The general result of the preceding remarks on the vital properties, is exhibited in the following table, which presents all these properties in one point of view.

	<i>Classes.</i>	<i>Genera.</i>	<i>Species.</i>	<i>Varieties.</i>
Properties	I. Vital	1. Sensibility	1. Animal.	1. Sensible.
			2. Contractility	
II. Of tissue	1. Extensibility.	2. Organic	2. Insensible.	
		2. Contractility.		

The peculiar motions of the iris, corpora cavernosa, &c. and the dilatation of the heart, are not included in this view, because our ideas on the relations which connect these to the other kinds of motion, and the differences which distinguish them, are not yet sufficiently clear.

From the properties which have just been explained, all the functions, all the phenomena of the animal economy, may be deduced; we may refer them all, in ultimate analysis, to one or the other, as we constantly arrive, in the consideration of physical phenomena, at the same principles, viz. attraction, elasticity, &c.

Wherever the vital properties are in activity, a disengagement of caloric takes place, peculiar to the animal, and composing for it a temperature independent of that of the medium in which it lives. The word calorificity, or calorification, is improper to express this phenomenon, which is a general effect of the two great vital powers in exercise, and does not flow from any particular faculty. We do not say digestibility, respirability, &c. because respiration, digestion, and other processes, are the results of functions deduced from the common laws: the production of heat is in the same case. The digestive force of Crimaud is an expression

preſion equally objectionable. The aſſimilation of heterogeneous ſubſtances to our organs is one of the grand reſults of ſenſibility and contractility, and not a peculiar property. The ſame obſervation will apply to the formative power of Blumenbach, that of fixed ſituation of Barthez, and to the various principles admitted by numerous authors who have attributed to functions, or reſults, names that indicate laws, or vital properties.

In the article *EMBRYO* we have given a ſketch of the fate of the two lives in the fetus: we ſhall add here a ſhort view of the changes which occur after birth.

A new mode of exiſtence commences as ſoon as the child has quitted the uterus: various functions are added to the organic life, and the animal, which has not yet begun, comes into exerciſe, eſtabliſhing relations, hitherto unknown, between the individual and ſurrounding objects. While the organs of the internal life act at once in a perfect manner, thoſe of the external require a kind of education, and arrive only by degrees at that perfection which they exhibit in the ſequel. The ſenſations are at firſt confuſed, and offer only general images: habit gradually deadens theſe firſt impreſſions, and then the particular ſenſations come to be diſtinguiſhed, after long and repeated exerciſe. Thus a man, introduced for the firſt time to the magic ſpectacle of an opera, perceives only a whole which pleases him; and he gradually ſeparates the ſources of pleaſure ariſing from the dancing, the muſic, the decorations, &c. The education of the brain in this reſpect reſembles that of the ſenſes: all the mental faculties dependent on its action acquire very gradually the degree of preciſion to which they are deſtined. Perception, memory, and imagination, which are always preceded and determined by ſenſation, are enlarged in proportion to their employment. The judgment, of which they are the triple baſis, at firſt aſſociates irregularly notions which are themſelves irregular: its exertions are ſoon diſtinguiſhed by greater clearneſs; and they become at laſt rigorous and preciſe.

The voice and locomotion preſent the ſame phenomena: the cries of young animals conſiſt, at firſt, of one uniform ſound, without any diſtinct character. Age gradually modifies them; and, after repeated exerciſe, they acquire the characters peculiar to each ſpecies. It is unneceſſary to mention ſpeech, as that is ſo evidently the reſult of education.

The muſcles of the newly born animal are in continual action; but progreſſion, or even ſtanding, cannot be effected. Habit muſt teach the art of connecting together particular contractions for the production of certain effects. Until this period has arrived, there is a vacillation in all the motions, particularly the general ones, which almoſt deprives the child of the power of locomotion.

It is obvious, then, that we are obliged to learn the art of extending our exiſtence beyond ourſelves; that the exterior life acquires freſh development every day, and demands a kind of apprenticeship, which is not obſerved in the organic life.

Society exerciſes a remarkable influence on this kind of education which the external organs undergo: it enlarges the ſphere of action in ſome, contracts it in others, and modifies it in all. The occupation in which an individual is habitually employed, almoſt always exerciſes one particular organ more than the others. The ear of the muſician, the palate of the cook, the brain of the philoſopher, the muſcles of the dancer, the larynx of the ſinger, &c. have, beſides the general education of the external life, a particular education, which frequent exerciſe carries to a high degree of perfection. Hence, the muſician and painter become able to diſtinguiſh in a harmony, or a picture, what eſcapes vulgar obſervation. In ſome inſtances, this perfection of

action in an exerciſed organ is accompanied by an exceſs of nutrition, as in the occupations where particular members are exerciſed greatly and habitually.

It is no leſs true, that when one organ is conſtantly occupied, the others are inactive, and appear to loſe in capability what the other gains. The philoſopher who ſpends his life in his ſtudy, and devotes himſelf to abſtract meditations, condemns his locomotive organs to inactivity, and hence loſes the facility of exerciſing them: the dancer is in the oppoſite ſtate. The obſervation of man in ſociety will lead us every moment to ſimilar remarks: perfection of action in the locomotive organs ſcarcely ever coincides with that of the brain or ſenſes; and *vice verſa*. This obſervation naturally leads to a fundamental principle of ſocial education; *viz.* that we ſhould never direct the attention to ſeveral ſtudies at once, if we wiſh to ſucceed in each; that it is vain for any individual to cultivate various departments of human knowledge and exertion with an expectation of ſhining in each; and that in general the ſecret of excelling in any one, is, to be inferior in all the reſt. For a more detailed account of theſe views, which are not, perhaps, ſtrictly phyſiological, ſee Bichat, *ſur la Vie et la Mort*, p. 121—130.

When the child quits the womb of the mother, its organic life undergoes a remarkable development: ſeveral functions, which did not exiſt before, are now brought into exerciſe; and thoſe which had begun become more enlarged. But the organs, in either caſe, require no education: they exhibit at once a degree of perfection, which thoſe of the animal life arrive at only after frequent exerciſe. Diſtention, reſpiration, a great part of the exhalations, and abſorptions, begin at birth: after the firſt acts in the reſpective organs, they proceed with as great facility as they will ever after poſſeſs. The glands, which had been hitherto inactive, or at leaſt had produced a very ſmall quantity of fluid, are excited by various applications to their excretory ducts. The paſſage of food over the openings of the ſalivary ducts, of the chyme over the pancreatic and biliary tubes, &c. ſtimulates the reſpective glands. The excretions now alſo begin: all theſe phenomena are at once executed with preciſion, and no education is required in the organs which exhibit them.

As all the organs of the internal life act perfectly at once, none can acquire in the ſequel a ſuperiority over the others, as in the animal life. Yet it is common, even here, for one ſyſtem to predominate over the reſt: ſometimes the blood-veſſels, ſometimes the pulmonary ſyſtem, ſometimes the gaſtric organs, and particularly the liver, are exerciſed beyond their due proportion, and give a peculiar character to the temperament. But the foundation of theſe differences ſeems to be laid in original difference of ſtructure: and the ſame is the caſe where one ſyſtem is remarkably weak.

“Such, then, concludes Bichat, is the leading difference of the two lives, in reſpect to the degree of perfection of the various ſyſtems of functions of which each conſiſts: in the animal, predomance or inferiority of one ſyſtem ariſes from the greater activity or indolence of that ſyſtem; in the organic, the original conformation is the cauſe. Hence, the physical temperament and the moral character cannot be changed by education, which has ſo vaſt an effect in modifying the animal life. The character, if I may uſe the expreſſion, is the phyſiognomy of the paſſions; the temperament is that of the internal functions: as both are conſtantly the ſame, and not influenced by habit and exerciſe, they cannot be affected by education. That may, indeed, beſtow ſuch perfection on the judgment and reflection, as to make them more powerful than the paſſions: it may fortify the animal life, and make it ſuperior to the impuſes of the organic

organic. But to attempt altering the character, softening or exalting the passions, of which it is the habitual expression, or enlarging or contracting their sphere, would be an enterprise analogous to that of permanently raising or diminishing the extraordinary force of the heart, or accelerating or retarding the motions of the arteries in the state of health. We should inform any person who entertained the latter project, that circulation and respiration are not under the influence of the will, and cannot, therefore, be modified by the individual, without the occurrence of disease. The same observation will apply to those who think they can change the character, and consequently the passions; since the latter are the produce of the actions of all the internal organs, or, at least, are especially seated in them."

For the mode in which the functions cease, the connections of the animal and organic life to each other, and the reciprocal influences of the heart, brain, and lungs, see DEATH. Cuvier, *Leçons d'Anatomie comparée*, tom. i. Bichat, *Recherches Physiologiques sur la Vie et la Mort*; and his *Anatomie Generale*, in the *Considerations Generales*.

*LIFE of Mind, vita mentis*, as contra-distinguished from life of body, *vita corporis*, is held, by the Cartesianists, to consist in a perpetual cogitation, or uninterrupted course of thinking; which seems likewise to have been Aristotle's meaning, when he calls the soul *ἐνδεχόμενον*, which his interpreters call *actus*; thinking being the only proper act of the mind. But Mr. Locke endeavours to refute this principle. See THINKING and SOUL.

*LIFE of Man, vita hominis*, consists of a continued communication of body and mind; or in operations, to which both the motions of the body and ideas of the mind contribute.

Thus, *e. gr.* the mind now thinking of something, on occasion of that thought there arises a certain motion in the body: and now, again, the body moves first, which motion is followed by some thought of the mind.

In such alternate or reciprocal operation does the life of man consist; considered, as he is a compound of body and mind. See SENSATION and MOTION.

*LIFE* is more particularly used for the duration of an animal's being; or the space of time that passeth between its birth and death.

*LIFE*, considered as an object of Law. See RIGHTS. See also HOMICIDE.

*LIFE-Annuities*, are annuities, the payments of which depend on the continuance of any given life or lives; and they may be distinguished into annuities to commence *immediately*, and annuities to commence at some future period, or *reversionary* life-annuities.

The value of a life-annuity is properly the sum that will be sufficient to enable a *seller* (allowing for the chances of mortality) to pay the annuity without loss; and, supposing money to bear no interest, it is always equal to the *expectation* of the life.

For example:—Observations shew, that according to the *mean* probabilities of the duration of human life, the *expectation* of a life aged ten is nearly forty years; or, in other words, that a set of lives at this age will, one with another, enjoy forty years each of existence, some of them enjoying a duration as much longer as others enjoy a shorter. It is obvious, therefore, that supposing money to bear no interest, 40*l.* in hand for each life, would be sufficient to enable a seller to pay to any number of such lives 1*l.* *per ann.* for their whole duration; or, in other words, that 40*l.* is, on this supposition, the value of a life aged ten.

But if any improvement is made of money by putting it out to interest this will be *more* than the value; because it will be more than sufficient to pay the annuity; and as much more than sufficient as the improvement or the interest is

greater. If, for instance, any sum now in hand may be improved, by being put out to interest, at 4 *per cent.* as to double itself in eighteen years; the seller of such an annuity will (in consequence of putting out *half* the purchase-money to interest) find himself, at the end of eighteen years, in possession of 42*l.* or of 20*l.* more than is sufficient to pay the remainder of the annuities, though he should make no farther improvement of the purchase-money. If he puts out the money to higher interest he will be a greater gainer; if to less, he will be a less gainer; but at any rate of interest he must be a gainer. The truth is, that supposing the interest to be that just mentioned, or 4 *per cent.* and all the improvement possible made of the money at this interest, he will find 17*l.* 10*s.* 6*d.* for each annuity (instead of 40*l.*) to be sufficient to enable him to make all his payments. (See the tables at the end of this article.) But that if he improves the money at 5 *per cent.* he will find 15*l.* to be sufficient.

It may seem to follow from hence, that we have nothing to do to find the value of a life-annuity, but to find the expectation of the life, and then to take out of the common tables the value of an annuity *certain* for a term of years equal to the expectation; and it may appear strange that this should not give the true value.

The truth is, that it will give the value *greater* than it is; or that a less sum than that found in this way will be sufficient to pay the annuity. Supposing the interest 4 *per cent.* the value of an annuity certain for forty years is 19*l.* 16*s.* (see Tab. III. ANNUITIES); but the value of a life aged ten, at this rate of interest, is, as hath been just said, no more than 17*l.* 10*s.* 6*d.* The principal reason of this is the difference between the value of forty payments of an annuity to be made *every* year regularly one after another, till in forty years they are all made; and the value of the same number of payments to be made at greater distances of time from one another, and not to be all made till the end of seventy or eighty years. In this last case there is more time given for the improvement of the purchase-money, and therefore a less sum will be sufficient to enable a seller to make his payments. All that is learned from knowing the expectation of a number of lives, is the *mean* number of payments that will be made to each of them, and not the time in which they will be made. For example:—The expectation of a life at ten being forty years, it follows that to a hundred lives at this age, forty payments for each life, or four thousand in all, will be made. But, as all the lives will not be extinct in less than seventy or eighty years, many of the payments will not be made till after the expiration of forty years; and, therefore, a part of the purchase-money will be improved for a longer time than forty years. In general, it may be observed that *one-half* nearly of the payments of a set of life-annuities will be made after the expiration of a term of years equal to the expectations of the lives; and that this half having a longer time for accumulation than the expectations of the lives, the value of the lives must be less than the value of annuities to be paid regularly every year for a time equal to the expectations. Thus 19*l.* will, in consequence of being improved at 4 *per cent.* pay a hundred annuities of 1*l.* for forty years. But a less sum (or 17*l.* 10*s.*) will pay a hundred such annuities to a set of lives whose common expectation is forty years; because *one-half* nearly of the payments will not be made till after the end of forty years, and some not till after the end of seventy or eighty years; and consequently *one-half* nearly of the purchase-money will be improved for more than forty years, and some of it for more than seventy or eighty years.

These observations demonstrate, that it is a mistake to reckon the value of a life-annuity the same either with the value of an annuity certain for a term of years equal to the

## LIFE-ANNUITIES.

expectation of the life; or with the value of an annuity for a term certain, equal to that which a life has an even chance of exiting. This is an error into which some have fallen, but it only proves their utter ignorance of the subject.

The true method of computing the values of life-annuities may be explained in the following manner. Let us suppose that the duration of the annuity is to be only *one* year. That is, that *1l.* is to be paid a year hence, provided a life now of a given age should be then in being. Were it certain that this life would not fail in the year, the value of the annuity would be the same with the value of it payable a year hence, or with the sum which, now put out to interest, would increase to *1l.* in a year; and this sum, supposing interest at *4 per cent.* is *19s. 3d.* See Tab. II. ANNUITIES.

But the payment not being to be made, should the life happen to fail in the year, this sum ought to be diminished in proportion to the degree of the uncertainty of the life's continuing to exist through the year; and it is easy to see that this *uncertainty* or *chance* is in the proportion of the number of persons at that age living at the end of the year, to the number living at the beginning of it, as shewn by observations. For example:—if it has been found in any situation that but half the number of persons of the given age living at the beginning of the year, are living at the end of it, the uncertainty will be as half; and the value just mentioned ought to be lessened one-half. If it appears that two-thirds, or nine-tenths, or ninety-nine hundredths, are living at the end of the year, the same value must be diminished only one-third, one-tenth, or one-hundredth. That is, it will be ne-

cessary to multiply it by  $\frac{1}{3}$ ,  $\frac{9}{10}$ , or  $\frac{99}{100}$ . Universally

then, the present value of any sum to be paid a year hence, provided a given life should be then existing, is that sum multiplied by the value of *1l.* payable at the end of the year (taken out of Tab. II. under the article ANNUITIES), and also by the fraction formed by making the number of the living at the age of the given life (taken out of the Table of Observations) the denominator, and the number of the living at the next succeeding age (or at the end of the year) the numerator. For example:—let the value be sought of *1l.* payable a year hence, if a child aged ten should be then living, reckoning interest at *4 per cent.* The value of *1l.* reckoning this interest, and payable a year hence, is (as has been just said) *19s. 3d.* or (in decimal parts of a pound,) *.9615*. (See Tab. II. under the article ANNUITIES.) The number of the living at the age of ten (in Tab. III. at the end of this article) is *5675*; and at the next succeeding age (or eleven) is *5623*. It follows, therefore, that according to this table, out of *5675* living at the age of ten, only *5623* are living at the end of the year: or, in other words, that the chance or probability of a life aged ten existing through the year is as  $\frac{5623}{5675}$ , which fraction, therefore, multiplied by *.9615*, gives the value sought, or *.9526* equal to *19s. 0½d.*

Again, let us suppose that the duration of a life-annuity of *1l.* is to be two years, or that one payment of *1l.* is to be made a year hence, provided a given life should exist a year, and a second payment of the same sum at the end of two years, provided the same life should be in existence at the end of two years. The method of finding the value of the first payment has been already explained; and by the very same reasoning it may be easily discovered, that the value of the second payment must be the value of *1l.* payable at the end of two years, diminished in proportion to the uncertainty that the given life will exist two years; or (which is the same) multiplied by the fraction formed by making the num-

ber of the living at the given age the denominator, and the number of the living at the next succeeding age but one, or at the end of two years, the numerator.

Thus. Let the value be required of *1l.* payable yearly for two years, provided a child aged ten should live two years, reckoning interest at *4 per cent.*

The value of the payment at the end of the first year has been just found to be *.9526* in decimal parts of a pound, or *19s. 0½d.*

The value of the payment at the end of the second year is the value of *1l.* payable two years hence, lessened by the uncertainty that a life aged ten will live two years; or in the proportion of the number of the living in the Table of Observations at the age of twelve to the number of the living at the age of ten. That is, it is *.9245* (the said value of *1l.* payable at the end of two years, taken out of Table II. under

the article ANNUITIES) multiplied by the fraction  $\frac{5573}{5675}$ , or

*.9078*, equal to *18s. 2d.* (See Table III. at the end of this article.) To this, add the former value, or *.9526l.* and the total, or *1.8604l.* will be the value of both payments, or of an annuity of *1l.* on a life aged ten for two years.

By proceeding in this way it will appear that the value of

the same annuity for three years is  $.8889 \times \frac{5523}{5675} + 1.8604$

$= 2.725l.$  and for eighty-six years (or the whole duration of life, according to the Table of Observations) *17.5238l.*

It is evident, that in the same method the value of an annuity of *1l.* on a life at any other age is to be found; and that supposing the annuity any other sum than *1l.* its value will be this sum multiplied by the value of an annuity of *1l.*

The calculations of the values of life-annuities may be otherwise explained in the following manner. Suppose a life-annuity of *1l.* payable yearly to every one of *5675* persons, all now aged ten, the first payment of which is to be made a year hence. It appears from the Northampton Table of Observations (or Table III. under the article EXPECTATION), that only *5623* of these persons will be living at the end of the year; and consequently, that the money then to be paid will be only *5623l.* The present value, therefore, of the first payment of the annuities will be the sum which being now put out to interest will increase in a year to *5623l.* That is, it is *5623l.* discounted for a year, or *5406l. 14s. 7od.* for this sum added to its interest for a year (reckoned at *4 per cent.*) will just make up *5623l.* From the same Table of Observations, it appears farther, that of *5675* persons living at ten years of age, only *5573* will be living at the end of two years. The present value, therefore, of the second payment of the annuities will be the sum, which being now put out to compound interest at *4 per cent.* will increase to *5573l.* in two years. The sum is *51526l. 5s.* In like manner *5523, 5473, 5423, &c.* being the number living at the end of three, four, five, &c. years, the value of the third, fourth, fifth, &c. payments of the annuities will be *5523l. 5473l. 5423l. &c.* discounted for three, four, five, &c. years respectively, and continued to the year in which all the lives become extinct. The total of all these values is *99443l.* which, therefore, is the sum that would be sufficient, if improved at *4 per cent.*, to make good the payment of an annuity of *1l.* for life to every one of *5675* persons aged ten, according to the Northampton Table of Observations. The value, therefore, of such an annuity payable to only one of this number, must be the *5675th* part of *99443l.* or *17l. 10s. 6d.*

# LIFE-ANNUITIES.

In the Table of Observations, from which the examples here given have been taken, and also in the table framed by Dr. Halley, from the bills of mortality at Breslaw in Silesia, it may be observed, that the numbers dying every year out of a given number born, continue in the middle stages of life nearly the same for many years together. It was this circumstance that led M. De Moivre to form his hypothesis of an equal decrement of life through all its stages after ten. In this hypothesis, the limit or utmost probable extent of life is fixed to the age of eighty-six; and out of any number living at a given age an equal number is reckoned to die every year, till at eighty-six all the lives become extinct. Thus, for instance, if there are seventy-six persons living at ten, one of them by this hypothesis will die annually during the term of seventy-six years, at the end of which time the last surviving life will have failed. Or, in other words, seventy-five will be living at the end of the first year, seventy-four at the end of the second year, seventy-three at the end of the third year, and so on for seventy-six years; from whence it follows that the probability of one person's living

to the end of the first, second, or third year will be  $\frac{75}{76}$ ,  $\frac{74}{76}$ ,  $\frac{73}{76}$ , &c. respectively, where it appears that the fractions,

and consequently the probabilities they express, decrease arithmetically. The number of years which a life wants of the age of eighty-six is in this hypothesis called the *complement* of the life, and half this complement is always the *expectation* of the life. That is, according to what has been already said, it is the number of years which one with another a set of lives at that age will exit; or, as the writers on this subject sometimes speak, it is the *share* of life due to each of them.

It is extremely easy to calculate the values of life-annuities on this hypothesis. For by what has been just said, the value of an annuity on a life aged ten, is the sum of the series

$$\frac{75}{76} \times .9615 + \frac{74}{76} \times .9245 + \frac{73}{76} \times .8889, \text{ \&c. continued}$$

$$\text{to } \frac{1}{76} \times .05271 - .96151 - .92451 - .88891 \text{ \&c. and}$$

.05271 being the values (reckoning interest at 4 per cent.) of 1*l.* payable at the end of 1, 2, 3, &c. to 76 years; or, calling 1*l.* with its interest for a year, *r*, and 76, *n*, the value of the

$$\text{life is } \frac{n-1}{nr} + \frac{n-2}{nr^2} + \frac{n-3}{nr^3} +, \text{ \&c.} = \frac{1}{r} + \frac{1}{r^2} + \frac{1}{r^3} + \dots + (n) - \frac{1}{nr} - \frac{1}{nr^2} - \frac{3}{nr^3} - \dots - (n) =$$

$$\frac{1}{r-1} - \frac{r}{n \cdot r-1} \times \frac{1}{r-1} - \frac{1}{r^n \cdot r-1}. \text{ But } \frac{1}{r-1} \text{ is}$$

equal to the perpetuity, and  $\frac{1}{r-1} - \frac{1}{r^n \cdot r-1}$  is equal to

an annuity certain for *n* years, therefore we have the following rule:

“Find in Table III. under ANNUITIES, the value of an annuity of 1*l.* certain for a number of years equal to the complement. Multiply this value by the perpetuity increased by unity, and divide the product by the complement. The quotient subtracted from the perpetuity will be the value.”

The complement in the present case being 76, the value of an annuity for 76 years being (see Tab. III. ANNUITIES) 23.7311, and the perpetuity 25, the value of a life aged 10,

will come out 16.881. In the same manner may the value of a life at any other age be computed according to this hypothesis: and these values are the same with those in M. De Moivre's table of the values of lives.

But it is a necessary observation, that in the first and last stages of life, this hypothesis differs too much from fact; which may be easily seen, by comparing it with the following tables of the probabilities of human life. It had better therefore be entirely rejected from the doctrine of annuities, especially as we are now furnished with correct tables, deduced from real observations, of the values both of *single* and *joint* lives. The labour and difficulty of forming such tables are also greatly lessened by means of an easy theorem given by Mr. Simpson in his book on the Doctrine of Annuities; and since by Dr. Price in his Treatise on Reverendary Payments. We shall here give the explanation and proof of this theorem from Mr. Morgan's Treatise on Annuities and Assurances, chap. ii. § 2. p. 56.

“Were it certain that a person of a given age would live to the end of a year, the value of an annuity of 1*l.* on such a life would be the present sum which would increase in a year to the value of a life one year older, together with the value of the single payment of 1*l.* to be made at the end of a year; that is, it would be 1*l.* together with the value of a life aged one year older than the given life, multiplied by the value of 1*l.* payable at the end of a year. Call the value of a life one year older than the given life *N*, and the value of

1*l.* payable at the end of a year  $\frac{1}{r}$ ; then will the value of an annuity on the given life, on the supposition of a certainty that it will exist a year, be  $\frac{1}{r} + \frac{1}{r} \times N$ . But the fact is, that it is *uncertain* whether the given life will exist to the end of the year. This last value, therefore, must be diminished in the proportion of this uncertainty; that is, it must be multiplied by the probability that the given life will survive one year, which supposing  $\frac{b}{a}$  to express this proba-

bility, will make it  $\frac{b}{ar} \times \frac{1}{1+N}$ .”

The great utility of this theorem will appear from the following examples. Suppose the probabilities of life as they are given in the third of the following tables, or the tables of observations for Northampton, and the rate of interest 4 per cent., or *r* = 1.04. By reasoning in the manner already explained, the value of a life aged 95 will be expressed by the single fraction  $\frac{1}{4} \times .9615 = .2403$ . The value of a life one year younger, will, by this theorem, be

$$\frac{4}{9 \times 1.04} \times \frac{1}{1 + .2403} = .5300. \text{ The value of a life}$$

two years younger, by the same theorem, will be  $\frac{9}{16 \times 1.04}$

$$\times \frac{1}{1 + .5300} = .82701. \text{ The value of a life three years}$$

younger, or at the age of 92, will be  $\frac{16}{24 \times 1.04} \times$

$\frac{1}{1 + .8270} = 1.1711$ . If we proceed in this manner, the value of every younger life will be deduced from that next preceding; nor will the number of multiplications necessary to determine the values (agreeably to any table of observations) of all lives, at all ages, much exceed the number of those which must otherwise have been used for finding the single value of the youngest life. See Table VI.

Mr. Morgan, after having given this account of the foregoing

# LIFE-ANNUITIES.

going theorem, and explained the method of verifying all the operations in proceeding by it from one life to another, applies the theorem to the calculation of the values of joint lives, and gives a familiar method of verifying all those operations.

But instead of following him in this, we shall resume our account of the general principles on which the values of life-annuities are calculated. We have already explained these, as far as annuities on single lives are concerned. From the same principles the method of finding the value of annuities on the joint continuance of any two lives, may be understood. Suppose the ages of two persons to be 50 and 60. It appears in Table III. that of 2857 persons living at 50, only 2776 will live to be 51; or, in other words, that the probability that a person at this age will live a year, is

$\frac{2776}{2857}$ . Also, it appears from the same table, that the probability that a person aged 60 will live to 61, is  $\frac{1956}{2038}$ .

The probability, therefore, that they will both live a year, (or the former to be 51, and the latter 61,) is the product of these two probabilities, or  $\frac{2776}{2857} \times \frac{1956}{2038} = \frac{5429856}{5822566}$

For it is well known, that the probability that any two independent events will both happen, is always the product arising from multiplying the probability of one event by the probability of the other.

In like manner, the probability that the former of these lives will live to be 52, 53, 54, &c. and the latter to be 62, 63, 64, &c. or that they will both live two, three, four, &c. years, is by the same table  $\frac{2694}{2857} \times \frac{1874}{2038}$ ,

$\frac{2612}{2857} \times \frac{1793}{2038}$ ,  $\frac{2530}{2857} \times \frac{1712}{2038}$ , &c. And according to the reasoning already used, these probabilities multiplied by the values (in Table II. ANNUITIES) of  $1l.$  payable at the end of one, two, three, four, &c. years, will give the present value of the first, second, third, fourth, &c. payments of an annuity dependent, on the joint continuance of the two lives; and the sum of these products for one, two, three, four, &c. years, will be the value of an annuity of  $1l.$  on the joint continuance of the two lives for one, two, three, four, &c. years; and if the products are continued to the extremity of the oldest life, their sum will be the value of an annuity on the whole duration of the joint lives.

The values of annuities on the joint continuance of three, or any other number of lives, are found in a similar manner. The several fractions expressing the respective probabilities of their continuing one, two, three, four, &c. years, being multiplied into one another, and also into  $1l.$  discounted as before; and the sum of the products arising from these multiplications continued to one, two, three, four, &c. years, or to the extremity of the oldest of the lives, will be the values of the annuity for one, two, three, four, &c. years, or for the whole duration of the joint lives.

With respect to annuities on the *longest* of any number of lives, the reasoning is not so simple. The following explanation, however, of the method of determining their values, when only *two* lives are concerned, will be easily understood. Suppose the ages of the two persons to be 50 and 60; and for the sake of more perspicuity, let  $a, b, c, d, e$ , &c. be the number of persons living in the table at the age of the younger life, at the beginning of the first, second, third, &c. years; and, in like manner, let  $m, n, o, p, q$ , &c. be the number of persons living in the table at the age of

the older life. From what has been already observed, the chances of the younger life's surviving the first, second, third, &c. year, will be  $\frac{b}{a}, \frac{c}{a}, \frac{d}{a}$ , &c.; and the chances

of the older life's surviving those years respectively will be  $\frac{n}{m}, \frac{o}{m}, \frac{p}{m}$ , &c.; and the chances that they will *not*

survive the first, second, third, &c. years, will be  $1 - \frac{b}{a}$ ,

$1 - \frac{c}{a}, 1 - \frac{d}{a}$ , &c. and  $1 - \frac{n}{m}, 1 - \frac{o}{m}, 1 - \frac{p}{m}$ , &c.

The chance, therefore, that both will die in the first year

will be  $1 - \frac{b}{a} \times 1 - \frac{n}{m} = 1 - \frac{b}{a} - \frac{n}{m} + \frac{bn}{am}$ ,

that both will die in the second year  $1 - \frac{c}{a} \times 1 - \frac{o}{m}$ ,

$= 1 - \frac{c}{a} - \frac{o}{m} + \frac{co}{am}$ , and so on for the other years. If

each of these expressions be subtracted from unity, we shall have  $\frac{b}{a} + \frac{n}{m} - \frac{bn}{am}$  for the chance that they will *not* both

die, that is, that one or other of them will live to the end

of the first year,  $\frac{c}{a} + \frac{o}{m} - \frac{co}{am}$  for the chance that they

will *not* both die in two years, &c. By continuing these expressions for as many years as are equal to the difference between the age of the younger life and of the oldest life in the table, and multiplying them respectively into  $1l.$  discounted for one, two, three, &c. years, we shall have the whole value of an annuity on the longest of the two lives. Let

$\frac{1}{r}, \frac{1}{r^2}, \frac{1}{r^3}$ , be  $1l.$  discounted for one, two, three, &c.

years, and the series expressing the annuity will be  $\frac{b}{ar} +$

$\frac{c}{ar^2} + \frac{d}{ar^3} + \&c. \dots + \frac{n}{mr} + \frac{o}{mr^2} + \frac{p}{mr^3} +$

$\&c. - \frac{bn}{amr} - \frac{co}{amr^2} - \frac{dp}{amr^3} - \&c.$  But the first

of these series is the value of an annuity of  $1l.$  on the younger life, the second the value of the like annuity on the older life, and the third the value of the same on the two joint lives: whence it follows, that if "from the sum of the values of the two single lives we subtract the value of the two joint lives, the remainder will be the value of an annuity on the longest of the two lives."

*Example.*—Let the ages of the two lives be 20 and 30, and let interest be reckoned at  $4l.$  per cent. The value by Table VI. of a life of 20 is 16.233, and of a life of 30 is 14.781. The sum of these two values is 30.814. The value of the joint lives by Table IX. is 11.873; and this value subtracted from 30.814, leaves 18.941 for the value of an annuity on the longest of the two lives.

This account leads to an easy explanation of the method of finding the value of reversionary life-annuities mentioned at the beginning of this article, that is, of life-annuities which are to commence on the survivorship of one or more lives beyond others. See REVERSIONS and SURVIVORSHIPS.

*Problem I.*—To approximate to the value of a given life according to any given table of observations.

*Solution.*—Take the difference between twice the expectation

# LIFE-ANNUITIES.

tion of the given life by the given table, and 86; and the value deduced from M. De Moivre's Table of the values of lives corresponding to that difference, provided it is not less than ten, will be the value of the life.

*Example*—The expectation of a life aged 15 is, by the Northampton Table of Observations, (or Table IV. under the article EXPECTATION,) 36½. The difference between twice this number and 86 is 13. And the value corresponding to the age of 13 in M. De Moivre's Table of the values of lives (or Table IV.) is 16.604, reckoning interest at 4 per cent.; and this is nearly the value of a life aged 15, by the Northampton Table.

*Scholium*.—It must be remembered that this rule is only an approximation, and should not be used except when recourse cannot be had to tables giving the values of lives agreeable to given observations. The method of calculating such tables has been before particularly explained.

*Problem II.*—To determine the value of any two joint lives by M. De Moivre's hypothesis, or on the supposition of an equal decrement of life, through all its stages.

*Solution.*—This value is expressed by the series  $\frac{n-1, m-1}{nmr} + \frac{n-2, m-2}{nmr^2} + \frac{n-3, m-3}{nmr^3} + \dots (m)$  supposing  $n$  to be the complement of the younger, and  $m$  the complement of the older life, which Mr. Simpson has given in his Treatise on Annuities, and Mr. Morgan in his edition of Dr. Price's Treatise on Reverfionary Payments, note L, appendix, has demonstrated to be  $= V - \frac{V+1}{n} \times$

$$\frac{P}{n-m-2V-1} \times \frac{P}{m} + 2V, \text{ V being the perpetuity,}$$

and P the value of an annuity certain for  $m$  years. From this theorem may be deduced the following rule. Reserve the difference between the complement of the *youngest* life and the complement of the *oldest* life increased by unity and by twice the perpetuity. Multiply this difference by the value of an annuity certain for a time equal to the complement of the oldest life; and by this complement divide the product, reserving the quotient. From twice the perpetuity subtract the reserved quotient, and multiply the remainder by the perpetuity increased by unity. This last product divided by the complement of the youngest life, and then subtracted from the perpetuity, will be the required value.

*Example.*—Let the joint lives be 10 and 15. Their complements by M. De Moivre's hypothesis are 76 and 71. The complement of the oldest life, increased by unity and twice the perpetuity, (or twice 25, reckoning interest at 4 per cent.) is 122; which lessened by 76, the complement of the youngest life, leaves 46 for the reserved difference. This difference multiplied by 23.456, (the value of an annuity certain for 71 years, by Table III. ANNUITIES,) and the product divided by 71, (the complement of the oldest life,) gives 15.196, the quotient to be reserved; which subtracted from double the perpetuity (or from 50), and the remainder (or 34.803) multiplied by the perpetuity increased by unity (or by 26), gives 904.878; which divided by 76 (the complement of the youngest life), and the quotient subtracted from the perpetuity, we have 13.093 for the value of two joint lives aged 10 to 15, by M. De Moivre's hypothesis.

By this rule, Table V. in the following collection of tables, was computed by Dr. Price. (See his Treatise on Reverfionary Payments.) To this he was induced by the consideration, that there was no table extant at that time of

the values of *joint* lives, except Mr. Simpson's for London, (Table III. in this collection,) which being founded on the state of human mortality in one of the worst of all situations, or among the inhabitants of London taken in the gross, was by no means fitted for general use. The truth also is, as hath been before observed, that neither do the tables formed from M. De Moivre's hypothesis give the values of single and joint lives with the exactness necessary to adapt them properly to general use; nor can it indeed be ever necessary to have recourse to them, as we are now possessed of those tables, deduced from real observations, which are inserted at the end of this collection.

*Problem III.*—To determine the value of an annuity on a given life for any number of years.

*Solution.*—Find the value of a life as many years older than the given life as are equal to the term for which the annuity is proposed. Multiply this value by 1*l.* payable at the end of this term, and also by the probability that the life will continue so long. Subtract the product from the present value of the life; and the remainder multiplied by the annuity will be the answer.

*Example.*—Let the annuity be 10*l.*, the rate of interest 4*l.* per cent., the age of the given life 30 years, and the term proposed 15 years. The value of a life aged 45 (or 15 years older than the given life) appears by Table VI. to be 12.283. The value of 1*l.* payable at the end of 15 years (by Table II. under ANNUITIES) is .5553, and the probability that the life will exist so long is (by

Table III. under the article EXPECTATION)  $\frac{3243}{4385}$ . These

three quantities multiplied into each other are equal to 5.051, which being subtracted from 14.781, (the present value of the given life by Table VI.) we have 9.730; and this remainder multiplied into 10 (the annuity) gives 97.30*l.* for the value required.

*Problem IV.*—To approximate to the value of an annuity for three joint lives, A, B, and C.

*Solution.*—Let A be the youngest, and C the oldest of the three proposed lives. Take the value of the two joint lives B and C, and find the age of a single life D of the same value. Then find the value of the joint lives A and D, which will be the answer.

*Example.*—Let the three given ages be 20, 30, and 60. The value, reckoning interest at 4 per cent., of the two oldest joint lives B and C (by Table XIII.) is 7.802, answering nearly to a single life D of 65 years (by Table VI.); and the value of the joint lives A and D (by Table XVI.) is 6.986, which will be the value required.

This rule was first given by Mr. Simpson in his Select Exercises; and the following comparison, taken from Dr. Price's Treatise on Reverfionary Payments, will shew its correctness.

Ages.	Value by rule at 4 per cent.	Correct Value.	Ages.	Value by rule at 4 per cent.	Correct Value.
10 20 30	10.563	10.433	10 10 10	12.244	12.200
15 25 35	9.840	9.738	20 20 20	10.504	10.342
20 30 40	9.085	8.986	30 30 30	9.351	9.221
30 40 50	7.651	7.571	40 40 40	7.984	7.865
40 50 60	6.016	5.994	50 50 50	6.432	6.317
50 60 70	4.238	4.219	60 60 60	4.816	4.755
55 65 75	3.292	3.298	70 70 70	3.000	2.995
			75 75 75	2.110	2.119

# LIFE-ANNUITIES.

**Problem V.**—To find the value of an annuity on the longest of three lives, A, B, and C.

**Solution.**—Let  $a, b, c, d, \&c.$  be the number of persons living in the table at the age of A, at the beginning of the first, second, third, &c. years;  $m, n, o, p, \&c.$  the same numbers at the age of B; and  $s, t, u, v, \&c.$  the like numbers at the age of C, the older of the three lives. By reasoning as in the case of the longest of two lives, the probability that A, B, and C, will die in one, two, three, &c.

years, will be  $1 - \frac{b}{a} \times 1 - \frac{n}{m} \times 1 - \frac{t}{s} \dots 1 - \frac{c}{a}$

$\times 1 - \frac{o}{m} \times 1 - \frac{u}{s} \dots 1 - \frac{d}{a} \times 1 - \frac{p}{m} \times 1 - \frac{v}{s}$

$\&c. = 1 - \frac{b}{a} - \frac{n}{m} - \frac{t}{s} + \frac{bn}{am} + \frac{bt}{as} + \frac{nt}{ms} - \frac{bnt}{ams}$

$\dots 1 - \frac{c}{a} - \frac{o}{m} - \frac{u}{s} + \frac{co}{am} + \frac{cu}{as} + \frac{ou}{ms} + \frac{cou}{ams}$

$\dots \&c.$  which being severally subtracted from unity, the

respective remainders, or  $\frac{b}{a} + \frac{n}{m} + \frac{t}{s} - \frac{bn}{am} - \frac{bt}{as} -$

$\frac{nt}{ms} + \frac{bnt}{ams} \dots \frac{c}{a} + \frac{o}{m} + \frac{u}{s} - \frac{co}{am} - \frac{cu}{as} - \frac{ou}{ms} +$

$\frac{cou}{ams} \dots \&c.$  will express the probability that one or

other of them will live to the end of one, two, three, &c.

years. These fractions being multiplied into  $\frac{1}{r}, \frac{1}{r^2}, \&c.$

we have  $\frac{b}{ar} + \frac{c}{ar^2} + \frac{d}{ar^3}, \&c. + \frac{n}{mr} + \frac{a}{mr^2} + \frac{p}{mr^3} +$

$\&c. \dots + \frac{t}{sr} + \frac{n}{sr^2} + \frac{uv}{sr^3}, \&c. \dots - \frac{bn}{amr} -$

$\frac{co}{amr^2} - \frac{dp}{amr^3}, \&c. - \frac{bt}{asr} - \frac{cu}{asr^2} - \frac{dv}{asr^3}, \&c. - \frac{nt}{msr}$

$- \frac{ou}{msr^2} - \frac{pv}{msr^3}, \&c. + \frac{bnt}{amsr} + \frac{cou}{amsr^2} + \frac{dpv}{amsr^3}, \&c.$

for the value required. Therefore the value of an annuity on the longest of the three lives, A, B, and C, is equal to the "sum of each pair of the two joint lives, subtracted from the sum of the three single lives, added to the value of the three joint lives."

**Example.**—Let the ages of A, B, and C, be 20, 30, and 60, respectively, and interest of money 4l. per cent. By Table IX. the value of the two joint lives A and B is 11.873, of B and C 7.802, and by Table XIII. of A and C 7.995; The sum of these three values is 27.67. By Table VI. the value of the single life of A is 16.033, of B 14.781, of C 9.039. By Problem V. the value of the three joint lives is 6.986. These four values added together are equal to 46.839; from which deducting 27.67, the value of each pair of joint lives found above, we have 19.169 for the value sought.

**Problem VI.**—To find the value of an annuity granted upon three lives, A, B, and C, on condition of its ceasing as soon as any two of them become extinct.

**Solution.**—This annuity must be paid during the three joint lives, which may be expressed by  $A \overline{B} \overline{C}$ ; also,

during the two joint lives of A and B, after C; during the two joint lives of A and C, after B; and during the two joint lives of B and C, after A. These last three values are respectively equal to  $A \overline{B} - A \overline{B} \overline{C}, A \overline{C} - A \overline{B} \overline{C},$  and  $B \overline{C} - A \overline{B} \overline{C}.$  (See article REVERSIONS.) Consequently the whole value will be  $A \overline{B} + A \overline{C} + B \overline{C} - 2 A \overline{B} \overline{C}$ ; therefore find the value of each pair of joint lives, viz. of A and B, of A and C, and of B and C. Then from the sum of these three values let twice the value of the three joint lives, A, B, and C, be deducted, and the remainder will be the answer.

**Example.**—Let the ages of A, B, and C, respectively be 20, 30, and 60. By Tables IX. and XIII. the value of the joint lives,

$\left. \begin{matrix} A, B \\ A, C \\ B, C \end{matrix} \right\} \text{ will be } \left\{ \begin{matrix} 11.873 \\ 7.995 \\ 7.802 \end{matrix} \right.$

the sum of which three numbers is 27.670. Moreover, the value of the three joint lives, A, B, and C, by problem V is 6.986; therefore 13.698 is the value required.

See on this subject Simpson's Doctrine of Life Annuities, Dr. Price's Treatise on Reversionary Payments, Mr. Baron Mafers on Life Annuities, and Mr. Morgan on the Doctrine of Life Annuities and Assurances.

TABLE I.

Shewing the probabilities of the duration of life, as deduced by Dr. Halley from observations on the bills of mortality at Breslaw in Silesia.

Ages.	Persons living.	Dec. of Life.	Ages.	Persons living.	Dec. of Life.	Ages.	Persons living.	Dec. of Life.
1	1000	145	31	523	8	61	232	10
2	855	57	32	515	8	62	222	10
3	798	38	33	507	8	63	212	10
4	760	28	34	499	9	64	202	10
5	732	22	35	490	9	65	192	10
6	710	18	36	481	9	66	182	10
7	692	12	37	472	9	67	172	10
8	680	10	38	463	9	68	162	10
9	670	9	39	454	9	69	152	10
10	661	8	40	445	9	70	142	11
11	653	7	41	436	9	71	131	11
12	646	6	42	427	10	72	120	11
13	640	6	43	417	10	73	109	11
14	634	6	44	407	10	74	98	10
15	628	6	45	397	10	75	88	10
16	622	6	46	387	10	76	78	10
17	616	6	47	377	10	77	68	10
18	610	6	48	367	10	78	58	9
19	604	6	49	357	11	79	49	8
20	598	6	50	346	11	80	41	7
21	592	6	51	335	11	81	34	6
22	586	7	52	324	11	82	28	5
23	579	6	53	313	11	83	23	4
24	573	6	54	302	10	84	19	4
25	567	7	55	292	10	85	15	4
26	560	7	56	282	10	86	11	3
27	553	7	57	272	10	87	8	3
28	546	7	58	262	10	88	5	2
29	539	8	59	252	10	89	3	2
30	531	8	60	242	10	90	1	1



# LIFE-ANNUITIES.

Age.	3 per ct.	3½ per ct.	4 per ct.	4½ per ct.	5 per ct.	6 per ct.
14	19.331	17.823	16.508	15.356	14.342	12.639
15	19.192	17.707	16.410	15.273	14.271	12.586
16	19.050	17.588	16.311	15.189	14.197	12.532
17	18.905	17.467	16.209	15.102	14.123	12.476
18	18.759	17.344	16.105	15.015	14.047	12.419
19	18.610	17.220	15.999	14.923	13.970	12.361
20	18.458	17.093	15.891	14.831	13.891	12.301
21	18.305	16.963	15.781	14.737	13.810	12.239
22	18.148	16.830	15.669	14.641	13.727	12.177
23	17.990	16.696	15.554	14.543	13.642	12.112
24	17.827	16.559	15.437	14.442	13.555	12.045
25	17.664	16.419	15.318	14.340	13.466	11.978
26	17.497	16.277	15.197	14.235	13.375	11.908
27	17.327	16.133	15.073	14.128	13.282	11.837
28	17.154	15.985	14.946	14.018	13.186	11.763
29	16.979	15.835	14.816	13.905	13.088	11.688
30	16.800	15.682	14.684	13.791	12.988	11.610
31	16.620	15.526	14.549	13.673	12.855	11.530
32	16.436	15.367	14.411	13.553	12.780	11.449
33	16.248	15.204	14.270	13.430	12.673	11.365
34	16.057	15.039	14.126	13.304	12.562	11.278
35	15.864	14.871	13.979	13.175	12.449	11.189
36	15.666	14.699	13.829	13.044	12.333	11.098
37	15.465	14.524	13.676	12.909	12.214	11.003
38	15.260	14.345	13.519	12.771	12.091	10.907
39	15.053	14.163	13.359	12.630	11.966	10.807
40	14.842	13.978	13.196	12.485	11.837	10.704
41	14.626	13.789	13.028	12.337	11.705	10.599
42	14.407	13.596	12.858	12.185	11.570	10.490
43	14.185	13.399	12.683	12.029	11.431	10.378
44	13.958	13.199	12.504	11.870	11.288	10.263
45	13.728	12.993	12.322	11.707	11.142	10.144
46	13.493	12.784	12.135	11.540	10.992	10.021
47	13.254	12.571	11.944	11.368	10.837	9.895
48	13.012	12.354	11.748	11.192	10.679	9.765
49	12.764	12.131	11.548	11.012	10.515	9.630
50	12.511	12.004	11.344	10.827	10.348	9.492
51	12.255	11.673	11.135	10.638	10.176	9.349
52	11.994	11.437	10.921	10.443	9.999	9.201
53	11.729	11.195	10.702	10.243	9.817	9.049
54	11.457	10.950	10.478	10.039	9.630	8.891
55	11.183	10.698	10.248	9.829	9.437	8.729
56	10.902	10.443	10.014	9.614	9.239	8.561
57	10.616	10.181	9.773	9.393	9.036	8.387
58	10.325	9.913	9.527	9.166	8.826	8.208
59	10.029	9.640	9.275	8.933	8.611	8.023
60	9.727	9.361	9.017	8.694	8.389	7.831
61	9.419	9.076	8.753	8.449	8.161	7.633
62	9.107	8.786	8.482	8.197	7.926	7.428
63	8.787	8.488	8.205	7.938	7.684	7.216
64	8.462	8.185	7.921	7.672	7.435	6.997
65	8.132	7.875	7.631	7.399	7.179	6.770
66	7.794	7.558	7.333	7.119	6.915	6.535
67	7.450	7.234	7.027	6.831	6.643	6.292
68	7.099	6.902	6.714	6.534	6.362	6.040
69	6.743	6.565	6.394	6.230	6.073	5.779
70	6.378	6.219	6.065	5.918	5.775	5.508
71	6.008	5.865	5.728	5.596	5.468	5.228

Age.	3 per ct.	3½ per ct.	4 per ct.	4½ per ct.	5 per ct.	6 per ct.
72	5.631	5.505	5.383	5.265	5.152	4.937
73	5.246	5.136	5.029	4.926	4.826	4.636
74	4.854	4.759	4.666	4.576	4.484	4.324
75	4.453	4.373	4.293	4.217	4.143	4.000
76	4.046	3.978	3.912	3.847	3.784	3.664
77	3.632	3.575	3.520	3.467	3.415	3.315
78	3.207	3.163	3.111	3.076	3.034	2.953
79	2.776	2.741	2.707	2.673	2.641	2.578
80	2.334	2.309	2.284	2.259	2.235	2.188
81	1.886	1.867	1.850	1.832	1.816	1.783
82	1.429	1.411	1.406	1.394	1.384	1.362
83	0.961	0.955	0.950	0.943	0.937	0.925
84	0.484	0.483	0.481	0.479	0.476	0.472
85	0.000	0.000	0.000	0.000	0.000	0.000

This Table is the same with M. De Moivre's Table of the values of single lives, published in his Treatise on Life Annuities, and carried as far as the age of 79 to three places of decimals, by Mr. Dodson, in his Mathematical Repository, vol. ii. p. 169.

TABLE V.

Shewing the value of an annuity on the joint continuance of two lives, according to M. De Moivre's hypothesis.

Age of the younger.	Age of the eldest.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.
10	10	15.206	13.342	11.855
	15	14.878	13.093	11.661
	20	14.503	12.808	11.430
	25	14.074	12.480	11.182
	30	13.585	12.102	10.884
	35	13.025	11.665	10.537
	40	12.381	11.156	10.128
	45	11.644	10.564	9.646
	50	10.796	9.871	9.074
	55	9.822	9.059	8.391
60	8.704	8.105	7.572	
65	7.417	6.980	6.585	
70	5.936	5.652	5.391	
15	15	14.574	12.860	11.478
	20	14.225	12.593	11.266
	25	13.822	12.281	11.022
	30	13.359	11.921	10.736
	35	12.824	11.501	10.402
	40	12.207	11.013	10.008
	45	11.496	10.440	9.541
	50	10.675	9.767	8.985
	55	9.727	8.975	8.318
	60	8.632	8.041	7.535
65	7.377	6.934	6.544	
70	5.932	5.623	5.364	
20	20	13.904	12.341	11.067
	25	13.531	12.051	10.840
	30	13.098	11.711	10.565
	35	12.594	11.314	10.278
	40	12.008	10.847	9.870

# LIFE-ANNUITIES.

Age of the youngest.	Age of the eldest.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	
20	45	11.325	10.297	9.420	
	50	10.536	9.648	8.880	
	55	9.617	8.879	8.233	
	60	8.549	7.967	7.448	
	65	7.308	6.882	6.495	
	70	5.868	5.590	5.333	
25	35	13.192	11.786	10.621	
	30	12.794	11.468	10.367	
	35	12.333	11.093	10.067	
	40	11.776	10.655	9.708	
	45	11.130	10.131	9.278	
	50	10.374	9.509	8.761	
30	55	9.488	8.766	8.134	
	60	8.452	7.880	7.371	
	65	7.241	6.826	6.440	
	70	5.826	5.551	5.294	
	35	30	12.434	11.182	10.133
		35	12.010	10.838	9.854
40		11.502	10.428	9.514	
45		10.898	9.936	9.112	
50		10.183	9.345	8.620	
55		9.338	8.634	8.018	
40	60	8.338	7.779	7.280	
	65	7.161	6.748	6.373	
	70	5.777	5.595	5.254	
	45	35	11.632	10.530	9.600
		40	11.175	10.157	9.291
		45	10.622	9.702	8.913
50		9.955	9.149	8.450	
55		9.156	8.476	7.879	
60		8.202	7.658	7.172	
50	65	7.066	6.662	6.294	
	70	5.718	5.450	5.203	
	55	40	10.777	9.826	9.014
		45	10.283	9.418	8.671
		50	9.677	8.911	8.244
		55	8.936	8.283	7.710
60		8.038	7.510	7.039	
65		6.951	6.556	6.198	
60	70	5.646	5.383	5.141	
	65	45	9.863	9.063	8.370
		50	9.331	8.619	7.987
		55	8.662	8.044	7.500
		60	7.831	7.332	6.875
		65	6.807	6.425	6.080
70		5.556	5.300	5.063	
70	50	8.892	8.235	7.660	
	55	8.312	7.738	7.230	
	60	7.568	7.091	6.664	
	65	6.623	6.258	5.926	
	70	5.442	5.193	4.964	
	75	55	7.849	7.332	6.873
60		7.220	6.781	6.386	
65		6.379	6.036	5.724	
70		5.201	5.053	4.833	

Age of the youngest.	Age of the eldest.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.
60	60	6.737	6.351	6.001
	65	6.043	5.730	5.444
	70	5.081	4.858	4.653
65	65	5.547	5.277	5.031
	70	4.773	4.571	4.385
70	70	4.270	4.104	3.952

TABLE VI.

Shewing the value of an annuity on any single life, according to the probabilities of living at Northampton, as given in Table III. under the article EXPECTATION. Interest reckoned at 3, 4, 5, 6, 7 and 8 per cent.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.	Value at 7 per cent.	Value at 8 per cent.
Birth		10.327	8.863			
1 year		13.008	11.274			
1	16.021	13.405	11.563	10.107	8.963	8.046
2	18.599	15.633	13.420	11.724	10.391	9.321
3	19.575	16.462	14.135	12.348	10.941	9.812
4	20.210	17.010	14.613	12.769	11.315	10.147
5	20.473	17.248	14.827	12.962	11.489	10.304
6	20.727	17.482	15.041	13.156	11.666	10.466
7	20.853	17.611	15.166	13.275	11.777	10.570
8	20.885	17.662	15.226	13.337	11.840	10.631
9	20.812	17.625	15.210	13.335	11.846	10.641
10	20.663	17.523	15.139	13.285	11.809	10.614
11	20.480	17.393	15.043	13.212	11.752	10.569
12	20.283	17.251	14.937	13.130	11.687	10.517
13	20.081	17.103	14.826	13.044	11.618	10.461
14	19.872	16.950	14.710	12.953	11.545	10.401
15	19.657	16.791	14.588	12.857	11.467	10.337
16	19.435	16.625	14.460	12.755	11.384	10.268
17	19.218	16.462	14.334	12.651	11.302	10.200
18	19.013	16.309	14.217	12.562	11.226	10.137
19	18.820	16.167	14.108	12.477	11.157	10.081
20	18.638	16.033	14.007	12.398	11.094	10.030
21	18.470	15.912	13.917	12.329	11.042	9.986
22	18.311	15.797	13.833	12.265	10.993	9.947
23	18.148	15.680	13.746	12.200	10.942	9.907
24	17.983	15.560	13.658	12.132	10.890	9.865
25	17.814	15.438	13.567	12.063	10.836	9.823
26	17.642	15.312	13.473	11.992	10.780	9.778
27	17.467	15.184	13.377	11.917	10.723	9.732
28	17.289	15.053	13.278	11.841	10.663	9.685
29	17.107	14.918	13.177	11.763	10.602	9.635
30	16.922	14.781	13.072	11.682	10.539	9.584
31	16.732	14.639	12.965	11.598	10.473	9.531
32	16.540	14.495	12.854	11.512	10.404	9.476
33	16.343	14.347	12.740	11.423	10.333	9.418
34	16.142	14.195	12.623	11.331	10.260	9.359
35	15.938	14.039	12.502	11.236	10.183	9.296
36	15.729	13.880	12.377	11.137	10.104	9.231
37	15.515	13.716	12.240	11.035	10.021	9.164
38	15.298	13.548	12.116	10.929	9.935	9.093
39	15.075	13.375	11.979	10.819	9.845	9.019

# LIFE-ANNUITIES.

TABLE VII.

Shewing the value of an annuity on the joint continuance of two lives, having the same common age, according to the Northampton Table of Observations.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.	Value at 7 per cent.	Value at 8 per cent.
40	14.848	13.197	11.837	10.705	9.752	8.941
41	14.620	13.028	11.605	10.589	9.657	8.863
42	14.391	12.838	11.551	10.473	9.562	8.783
43	14.162	12.657	11.407	10.356	9.466	8.703
44	13.929	12.472	11.258	10.235	9.366	8.620
45	13.692	12.283	11.105	10.110	9.262	8.533
46	13.455	12.089	10.947	9.980	9.154	8.443
47	13.203	11.890	10.784	9.846	9.042	8.348
48	12.951	11.685	10.616	9.707	8.925	8.249
49	12.693	11.475	10.443	9.563	8.804	8.146
50	12.436	11.264	10.269	9.417	8.681	8.041
51	12.185	11.057	10.097	9.273	8.559	7.937
52	11.930	10.849	9.925	9.129	8.437	7.833
53	11.674	10.637	9.748	8.980	8.311	7.725
54	11.414	10.421	9.567	8.827	8.181	7.614
55	11.150	10.201	9.382	8.670	8.047	7.499
56	10.882	9.977	9.193	8.509	7.909	7.379
57	10.611	9.749	8.999	8.343	7.766	7.256
58	10.337	9.516	8.801	8.173	7.619	7.128
59	10.058	9.280	8.599	7.999	7.468	6.996
60	9.777	9.039	8.392	7.820	7.312	6.860
61	9.493	8.795	8.181	7.637	7.152	6.719
62	9.205	8.547	7.966	7.449	6.988	6.574
63	8.910	8.291	7.742	7.253	6.815	6.421
64	8.611	8.030	7.514	7.052	6.637	6.262
65	8.304	7.761	7.276	6.841	6.449	6.095
66	7.994	7.488	7.034	6.625	6.256	5.922
67	7.682	7.211	6.787	6.405	6.058	5.743
68	7.367	6.930	6.536	6.179	5.855	5.559
69	7.051	6.647	6.281	5.949	5.646	5.370
70	6.734	6.361	6.023	5.716	5.434	5.176
71	6.418	6.075	5.764	5.479	5.218	4.978
72	6.103	5.790	5.504	5.241	5.000	4.778
73	5.794	5.507	5.245	5.004	4.781	4.576
74	5.491	5.230	4.990	4.769	4.565	4.375
75	5.199	4.962	4.744	4.542	4.354	4.180
76	4.925	4.710	4.511	4.326	4.154	3.994
77	4.652	4.457	4.277	4.109	3.952	3.806
78	4.372	4.197	4.035	3.884	3.742	3.609
79	4.077	3.921	3.776	3.641	3.514	3.394
80	3.781	3.643	3.515	3.394	3.281	3.174
81	3.499	3.377	3.263	3.156	3.055	2.960
82	3.229	3.122	3.020	2.926	2.836	2.751
83	2.982	2.887	2.797	2.713	2.632	2.557
84	2.733	2.708	2.627	2.551	2.479	2.410
85	2.620	2.543	2.471	2.402	2.337	2.275
86	2.462	2.393	2.328	2.266	2.207	2.151
87	2.312	2.251	2.193	2.138	2.085	2.035
88	2.185	2.131	2.080	2.031	1.984	1.939
89	2.013	1.967	1.924	1.882	1.842	1.803
90	1.794	1.758	1.723	1.689	1.656	1.625
91	1.591	1.474	1.447	1.422	1.398	1.374
92	1.190	1.171	1.153	1.136	1.118	1.102
93	0.839	0.827	0.816	0.806	0.795	0.785
94	0.536	0.530	0.524	0.518	0.512	0.507
95	0.242	0.240	0.238	0.236	0.234	0.232
96	0.000	0.000	0.000	0.000	0.000	0.000

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1—1	9.491	8.251	7.287	6.515
2—2	12.789	11.167	9.793	8.741
3—3	14.166	12.325	10.892	9.689
4—4	15.181	13.185	11.621	10.565
5—5	15.638	13.591	11.984	10.691
6—6	16.099	14.005	12.358	11.031
7—7	16.375	14.224	12.596	11.251
8—8	16.510	14.399	12.731	11.382
9—9	16.483	14.396	12.744	11.404
10—10	16.339	14.277	12.665	11.345
11—11	16.142	14.133	12.546	11.249
12—12	15.926	13.966	12.411	11.139
13—13	15.702	13.789	12.268	11.023
14—14	15.470	13.604	12.118	10.899
15—15	15.229	13.411	11.960	10.767
16—16	14.979	13.212	11.793	10.626
17—17	14.737	13.019	11.630	10.489
18—18	14.516	12.841	11.483	10.365
19—19	14.316	12.679	11.351	10.255
20—20	14.133	12.535	11.232	10.156
21—21	13.974	12.409	11.131	10.074
22—22	13.830	12.293	11.042	10.002
23—23	13.683	12.179	10.951	9.928
24—24	13.534	12.062	10.858	9.853
25—25	13.383	11.944	10.764	9.776
26—26	13.230	11.822	10.667	9.697
27—27	13.074	11.699	10.567	9.616
28—28	12.915	11.573	10.466	9.533
29—29	12.754	11.445	10.362	9.448
30—30	12.589	11.313	10.255	9.360
31—31	12.422	11.179	10.140	9.270
32—32	12.253	11.042	10.034	9.178
33—33	12.079	10.902	9.919	9.082
34—34	11.902	10.759	9.801	8.984
35—35	11.722	10.612	9.680	8.883
36—36	11.539	10.462	9.555	8.778
37—37	11.351	10.307	9.427	8.670
38—38	11.160	10.149	9.294	8.558
39—39	10.964	9.986	9.158	8.442
40—40	10.764	9.820	9.016	8.322
41—41	10.565	9.654	8.876	8.202
42—42	10.369	9.491	8.737	8.083
43—43	10.175	9.326	8.599	7.965
44—44	9.978	9.160	8.457	7.843
45—45	9.776	8.990	8.312	7.718
46—46	9.571	8.815	8.162	7.589
47—47	9.362	8.637	8.008	7.455
48—48	9.149	8.453	7.849	7.316
49—49	8.931	8.266	7.686	7.173
50—50	8.714	8.081	7.522	7.030
51—51	8.507	7.900	7.366	6.893
52—52	8.304	7.723	7.213	6.758
53—53	8.099	7.544	7.056	6.620
54—54	7.891	7.362	6.897	6.480
55—55	7.681	7.179	6.735	6.335
56—56	7.470	6.993	6.571	6.190
57—57	7.256	6.805	6.404	6.041

# LIFE-ANNUITIES.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
58—58	7.041	6.614	6.234	5.890
59—59	6.824	6.421	6.062	5.735
60—60	6.606	6.226	5.888	5.579
61—61	6.387	6.030	5.712	5.420
62—62	6.166	5.831	5.533	5.259
63—63	5.938	5.626	5.347	5.089
64—64	5.709	5.417	5.158	4.917
65—65	5.471	5.201	4.960	4.736
66—66	5.231	4.982	4.759	4.551
67—67	4.990	4.760	4.555	4.363
68—68	4.747	4.537	4.348	4.171
69—69	4.504	4.312	4.140	3.977
70—70	4.261	4.087	3.930	3.781
71—71	4.020	3.862	3.719	3.584
72—72	3.781	3.639	3.510	3.387
73—73	3.548	3.421	3.304	3.193
74—74	3.324	3.211	3.105	3.005
75—75	3.114	3.015	2.917	2.827
76—76	2.920	2.833	2.750	2.668
77—77	2.741	2.656	2.583	2.511
78—78	2.550	2.470	2.410	2.346
79—79	2.338	2.271	2.217	2.161
80—80	2.122	2.068	2.018	1.969
81—81	1.917	1.869	1.827	1.785
82—82	1.719	1.681	1.642	1.606
83—83	1.538	1.510	1.472	1.441
84—84	1.416	1.387	1.357	1.330
85—85	1.309	1.339	1.256	1.232
86—86	1.218	1.195	1.171	1.140
87—87	1.141	1.124	1.098	1.078
88—88	1.103	1.030	1.063	1.044
89—89	1.036	1.015	1.001	0.984
90—90	0.938	0.922	0.900	0.895
91—91	0.769	0.756	0.748	0.737
92—92	0.591	0.583	0.569	0.560
93—93	0.369	0.365	0.361	0.357
94—94	0.203	0.201	0.199	0.197
95—95	0.060	0.060	0.059	0.058
96—96	0.000	0.000	0.000	0.000

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
11—16	15.538	13.664	12.158	10.929
12—17	15.308	13.480	12.009	10.805
13—18	15.086	13.303	11.864	10.685
14—19	14.870	13.130	11.723	10.568
15—20	14.660	12.961	11.585	10.453
16—21	14.457	12.799	11.452	10.342
17—22	14.265	12.646	11.327	10.239
18—23	14.082	12.500	11.209	10.140
19—24	13.908	12.361	11.096	10.048
20—25	13.741	12.229	10.989	9.960
21—26	13.584	12.105	10.890	9.879
22—27	13.433	11.987	10.796	9.803
23—28	13.280	11.866	10.699	9.724
24—29	13.124	11.743	10.600	9.643
25—30	12.966	11.618	10.499	9.561
26—31	12.805	11.489	10.396	9.476
27—32	12.641	11.359	10.289	9.389
28—33	12.474	11.225	10.181	9.299
29—34	12.304	11.088	10.069	9.207
30—35	12.131	10.948	9.954	9.112
31—36	11.955	10.805	9.837	9.014
32—37	11.775	10.659	9.716	8.913
33—38	11.592	10.508	9.591	8.808
34—39	11.404	10.354	9.463	8.701
35—40	11.213	10.196	9.331	8.589
36—41	11.021	10.037	9.198	8.476
37—42	10.828	9.877	9.062	8.362
38—43	10.635	9.716	8.927	8.246
39—44	10.437	9.550	8.787	8.127
40—45	10.236	9.381	8.643	8.003
41—46	10.033	9.210	8.497	7.878
42—47	9.829	9.037	8.350	7.751
43—48	9.624	8.862	8.200	7.621
44—49	9.414	8.683	8.046	7.483
45—50	9.204	8.503	7.891	7.353
46—51	8.997	8.326	7.737	7.219
47—52	8.790	8.147	7.582	7.084
48—53	8.579	7.965	7.424	6.945
49—54	8.366	7.780	7.262	6.8.2
50—55	8.152	7.593	7.098	6.658
51—56	7.941	7.409	6.936	6.515
52—57	7.730	7.225	6.774	6.371
53—58	7.518	7.039	6.609	6.225
54—59	7.304	6.850	6.442	6.076
55—60	7.088	6.659	6.272	5.924
56—61	6.870	6.465	6.100	5.770
57—62	6.651	6.270	5.925	5.613
58—63	6.427	6.070	5.744	5.450
59—64	6.201	5.867	5.561	5.284
60—65	5.970	5.658	5.372	5.112
61—66	5.737	5.447	5.180	4.938
62—67	5.503	5.285	4.986	4.760
63—68	5.265	5.017	4.786	4.576
64—69	5.025	4.798	4.585	4.390
65—70	4.783	4.573	4.378	4.199
66—71	4.540	4.349	4.169	4.005
67—72	4.298	4.124	3.960	3.811
68—73	4.059	3.901	3.752	3.616
69—74	3.825	3.683	3.547	3.423
70—75	3.590	3.471	3.347	3.236
71—76	3.386	3.270	3.159	3.059
72—77	3.176	3.070	2.971	2.882
73—78	2.963	2.869	2.780	2.701

TABLE VIII.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *five* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1—6	12.347	10.741	9.479	8.467
2—7	14.461	12.581	11.100	9.911
3—8	15.300	13.319	11.755	10.498
4—9	15.809	13.775	12.165	10.869
5—10	15.974	13.933	12.315	11.010
6—11	16.110	14.068	12.447	11.136
7—12	16.137	14.111	12.498	11.192
8—13	16.089	14.089	12.492	11.197
9—14	15.957	13.992	12.421	11.144
10—15	15.762	13.841	12.302	11.048

# LIFE-ANNUITIES.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
74-79	2.743	2.659	2.580	2.511
75-80	2.526	2.448	2.381	2.323
76-81	2.325	2.258	2.195	2.147
77-82	2.131	2.077	2.013	1.975
78-83	1.947	1.899	1.838	1.810
79-84	1.793	1.751	1.750	1.672
80-85	1.645	1.608	1.573	1.539
81-86	1.511	1.478	1.447	1.417
82-87	1.385	1.356	1.329	1.303
83-88	1.284	1.259	1.235	1.212
84-89	1.188	1.164	1.145	1.124
85-90	1.074	1.054	1.033	1.021
86-91	0.921	0.902	0.892	0.879
87-92	0.756	0.738	0.734	0.725
88-93	0.562	0.554	0.547	0.541
89-94	0.377	0.373	0.369	0.365
90-95	0.179	0.177	0.175	0.174
91-96	0.000	0.000	0.000	0.000

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
33-43	11.007	10.027	9.190	8.471
34-44	10.817	9.860	9.058	8.358
35-45	10.622	9.700	8.921	8.242
36-46	10.424	9.540	8.781	8.122
37-47	10.221	9.370	8.636	7.998
38-48	10.014	9.195	8.487	7.870
39-49	9.803	9.015	8.333	7.737
40-50	9.590	8.834	8.177	7.602
41-51	9.393	8.658	8.025	7.470
42-52	9.179	8.483	7.875	7.340
43-53	8.975	8.308	7.724	7.208
44-54	8.767	8.130	7.569	7.073
45-55	8.557	7.948	7.411	6.935
46-56	8.344	7.763	7.249	6.793
47-57	8.127	7.574	7.084	6.648
48-58	7.907	7.382	6.915	6.498
49-59	7.684	7.186	6.742	6.344
50-60	7.461	6.980	6.568	6.189
51-61	7.240	6.795	6.395	6.035
52-62	7.021	6.600	6.222	5.880
53-63	6.795	6.399	6.042	5.719
54-64	6.568	6.166	5.860	5.555
55-65	6.334	5.986	5.671	5.384
56-66	6.098	5.774	5.479	5.209
57-67	5.860	5.559	5.283	5.031
58-68	5.621	5.341	5.084	4.849
59-69	5.380	5.121	4.883	4.665
60-70	5.139	4.920	4.680	4.478
61-71	4.898	4.679	4.476	4.289
62-72	4.659	4.458	4.272	4.099
63-73	4.420	4.236	4.066	3.908
64-74	4.186	4.019	3.864	3.719
65-75	3.958	3.806	3.665	3.533
66-76	3.743	3.606	3.477	3.357
67-77	3.529	3.405	3.289	3.180
68-78	3.310	3.199	3.095	2.996
69-79	3.077	2.979	2.887	2.799
70-80	2.843	2.757	2.675	2.598
71-81	2.618	2.542	2.470	2.402
72-82	2.401	2.334	2.271	2.211
73-83	2.199	2.141	2.085	2.032
74-84	2.043	1.991	1.941	1.894
75-85	1.903	1.856	1.811	1.769
76-86	1.781	1.739	1.699	1.661
77-87	1.670	1.633	1.597	1.562
78-88	1.580	1.546	1.514	1.483
79-89	1.456	1.427	1.400	1.373
80-90	1.302	1.278	1.255	1.234
81-91	1.096	1.078	1.061	1.044
82-92	0.877	0.864	0.852	0.840
83-93	0.622	0.614	0.606	0.599
84-94	0.408	0.403	0.398	0.394
85-95	0.189	0.187	0.185	0.183
86-96	0.000	0.000	0.000	0.000

TABLE IX.

Showing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age ten years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1-11	12.346	10.782	9.544	8.547
2-12	14.239	12.438	11.010	9.857
3-13	14.895	13.019	11.528	10.324
4-14	15.287	13.374	11.850	10.617
5-15	15.391	13.479	11.954	10.716
6-16	15.486	13.578	12.052	10.812
7-17	15.490	13.599	12.083	10.849
8-18	15.436	13.569	12.070	10.847
9-19	15.316	13.482	12.006	10.799
10-20	15.151	13.355	11.906	10.719
11-21	14.974	13.217	11.797	10.631
12-22	14.795	13.078	11.686	10.541
13-23	14.612	12.934	11.570	10.446
14-24	14.424	12.784	11.450	10.348
15-25	14.230	12.630	11.324	10.244
16-26	14.030	12.470	11.193	10.135
17-27	13.832	12.311	11.063	10.027
18-28	13.642	12.158	10.939	9.924
19-29	13.461	12.013	10.820	9.826
20-30	13.286	11.873	10.707	9.732
21-31	13.121	11.742	10.600	9.644
22-32	12.961	11.615	10.498	9.561
23-33	12.798	11.485	10.393	9.474
24-34	12.632	11.352	10.285	9.386
25-35	12.463	11.217	10.175	9.295
26-36	12.291	11.078	10.062	9.201
27-37	12.116	10.936	9.945	9.105
28-38	11.937	10.791	9.826	9.005
29-39	11.755	10.642	9.703	8.902
30-40	11.568	10.490	9.576	8.795
31-41	11.382	10.336	9.448	8.688
32-42	11.195	10.182	9.320	8.580

# LIFE-ANNUITIES.

### TABLE X.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *fifteen* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1—16	11.864	10.406	9.243	8.301
2—17	13.059	11.081	10.042	9.555
3—18	14.277	12.531	11.134	9.908
4—19	14.657	12.876	11.447	10.284
5—20	14.776	12.993	11.561	10.391
6—21	14.904	13.121	11.685	10.510
7—22	14.950	13.178	11.748	10.576
8—23	14.929	13.178	11.761	10.597
9—24	14.834	13.112	11.715	10.566
10—25	14.683	12.998	11.627	10.497
11—26	14.508	12.861	11.519	10.410
12—27	14.323	12.715	11.402	10.314
13—28	14.132	12.564	11.280	10.215
14—29	13.936	12.408	11.153	10.110
15—30	13.734	12.246	11.021	10.001
16—31	13.527	12.078	10.883	9.886
17—32	13.320	11.911	10.746	9.771
18—33	13.121	11.750	10.613	9.660
19—34	12.930	11.595	10.486	9.554
20—35	12.744	11.445	10.363	9.451
21—36	12.567	11.302	10.246	9.354
22—37	12.394	11.163	10.132	9.260
23—38	12.218	11.020	10.015	9.163
24—39	12.038	10.874	9.895	9.063
25—40	11.854	10.735	9.771	8.960
26—41	11.670	10.574	9.647	8.855
27—42	11.486	10.423	9.522	8.751
28—43	11.302	10.272	9.396	8.645
29—44	11.114	10.117	9.267	8.536
30—45	10.923	9.959	9.135	8.424
31—46	10.728	9.797	8.998	8.309
32—47	10.530	9.631	8.858	8.180
33—48	10.327	9.461	8.714	8.066
34—49	10.120	9.286	8.565	7.938
35—50	9.912	9.110	8.415	7.809
36—51	9.707	8.937	8.267	7.681
37—52	9.503	8.763	8.119	7.553
38—53	9.296	8.586	7.966	7.421
39—54	9.085	8.406	7.810	7.286
40—55	8.870	8.221	7.651	7.146
41—56	8.655	8.035	7.489	7.005
42—57	8.439	7.848	7.326	6.862
43—58	8.222	7.660	7.162	6.718
44—59	8.003	7.469	6.994	6.570
45—60	7.781	7.274	6.822	6.418
46—61	7.556	7.076	6.648	6.263
47—62	7.328	6.875	6.469	6.104
48—63	7.093	6.667	6.283	5.937
49—64	6.854	6.454	6.093	5.767
50—65	6.611	6.236	5.897	5.590
51—66	6.367	6.019	5.701	5.412
52—67	6.127	5.801	5.504	5.233
53—68	5.884	5.580	5.303	5.050
54—69	5.638	5.357	5.100	4.864
55—70	5.391	5.132	4.893	4.674

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
56—71	5.145	4.905	4.685	4.482
57—72	4.899	4.679	4.477	4.289
58—73	4.656	4.455	4.269	4.096
59—74	4.418	4.234	4.064	3.906
60—75	4.189	4.021	3.866	3.721
61—76	3.974	3.821	3.679	3.546
62—77	3.760	3.621	3.492	3.371
63—78	3.538	3.414	3.297	3.188
64—79	3.333	3.192	3.088	2.990
65—80	3.003	2.965	2.873	2.786
66—81	2.833	2.746	2.664	2.587
67—82	2.610	2.533	2.461	2.393
68—83	2.403	2.336	2.272	2.211
69—84	2.244	2.183	2.122	2.071
70—85	2.097	2.042	1.991	1.941
71—86	1.963	1.914	1.867	1.823
72—87	1.838	1.794	1.753	1.713
73—88	1.736	1.697	1.660	1.625
74—89	1.603	1.570	1.538	1.508
75—90	1.440	1.413	1.387	1.361
76—91	1.221	1.200	1.180	1.160
77—92	0.985	0.970	0.955	0.942
78—93	0.766	0.697	0.688	0.679
79—94	0.458	0.453	0.448	0.443
80—95	0.210	0.208	0.206	0.204
81—96	0.000	0.000	0.000	0.000

### TABLE XI.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *twenty* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1—21	11.413	10.053	8.965	8.070
2—22	13.172	11.605	10.344	9.313
3—23	13.794	12.161	10.843	9.764
4—24	14.178	12.511	11.163	10.057
5—25	14.301	12.633	11.281	10.170
6—26	14.420	12.754	11.400	10.285
7—27	14.451	12.798	11.452	10.341
8—28	14.417	12.786	11.455	10.354
9—29	14.310	12.710	11.401	10.315
10—30	14.150	12.586	11.304	10.239
11—31	13.965	12.441	11.188	10.144
12—32	13.770	12.286	11.062	10.042
13—33	13.570	12.125	10.932	9.934
14—34	13.363	11.959	10.796	9.822
15—35	13.151	11.787	10.655	9.703
16—36	12.932	11.609	10.507	9.579
17—37	12.714	11.430	10.358	9.454
18—38	12.502	11.257	10.214	9.333
19—39	12.297	11.089	10.074	9.215
20—40	12.096	10.924	9.937	9.100
21—41	11.906	10.768	9.805	8.992
22—42	11.723	10.619	9.689	8.889
23—43	11.540	10.470	9.562	8.785

# LIFE-ANNUITIES.

## TABLE XII.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *twenty-five years.*

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
24-44	11.354	10.317	9.435	8.670
25-45	11.164	10.160	9.304	8.569
26-46	10.970	10.000	9.170	8.455
27-47	10.773	9.836	9.032	8.338
28-48	10.572	9.667	8.890	8.217
29-49	10.366	9.495	8.744	8.092
30-50	10.160	9.321	8.596	7.966
31-51	9.957	9.151	8.451	7.841
32-52	9.756	8.980	8.306	7.716
33-53	9.550	8.806	8.157	7.588
34-54	9.342	8.629	8.005	7.457
35-55	9.131	8.448	7.849	7.322
35-56	8.916	8.264	7.690	7.183
37-57	8.699	8.076	7.527	7.041
38-58	8.477	7.884	7.360	6.894
39-59	8.253	7.689	7.189	6.744
40-60	8.025	7.490	7.015	6.590
41-61	7.796	7.290	6.838	6.434
42-62	7.567	7.088	6.660	6.276
43-63	7.332	6.881	6.477	6.112
44-64	7.095	6.671	6.289	5.944
45-65	6.850	6.453	6.094	5.769
46-66	6.602	6.230	5.894	5.588
47-67	6.351	6.004	5.690	5.403
48-68	6.096	5.774	5.481	5.213
49-69	5.839	5.541	5.268	5.019
50-70	5.582	5.306	5.054	4.822
51-71	5.328	5.074	4.841	4.626
52-72	5.077	4.845	4.630	4.430
53-73	4.829	4.614	4.417	4.234
54-74	4.585	4.389	4.208	4.040
55-75	4.350	4.171	4.006	3.852
56-76	4.120	3.956	3.815	3.674
57-77	3.908	3.761	3.623	3.494
58-78	3.682	3.549	3.424	3.308
59-79	3.440	3.322	3.210	3.105
60-80	3.197	3.092	2.992	2.890
61-81	2.964	2.870	2.782	2.699
62-82	2.739	2.656	2.578	2.504
63-83	2.530	2.457	2.387	2.321
64-84	2.371	2.305	2.242	2.182
65-85	2.223	2.163	2.107	2.053
66-86	2.089	2.035	1.984	1.936
67-87	1.963	1.915	1.870	1.826
68-88	1.860	1.817	1.777	1.737
69-89	1.722	1.685	1.650	1.616
70-90	1.545	1.515	1.486	1.459
71-91	1.393	1.280	1.259	1.238
72-92	1.044	1.028	1.012	0.997
73-93	0.743	0.733	0.723	0.714
74-94	0.480	0.474	0.469	0.464
75-95	0.219	0.217	0.215	0.213
76-96	0.060	0.060	0.060	0.060

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1-26	11.037	9.770	8.742	7.897
2-27	12.722	11.264	10.080	9.104
3-28	13.307	11.790	10.555	9.537
4-29	13.661	12.116	10.855	9.813
5-30	13.762	12.220	10.959	9.913
6-31	13.859	12.322	11.002	10.015
7-32	13.871	12.350	11.100	10.060
8-33	13.820	12.323	11.000	10.061
9-34	13.698	12.234	11.024	10.012
10-35	13.525	12.098	10.916	9.925
11-36	13.328	11.941	10.788	9.820
12-37	13.120	11.773	10.651	9.707
13-38	12.906	11.600	10.509	9.588
14-39	12.686	11.420	10.360	9.464
15-40	12.459	11.234	10.205	9.333
16-41	12.220	11.044	10.046	9.198
17-42	12.002	10.856	9.889	9.065
18-43	11.785	10.677	9.739	8.938
19-44	11.574	10.502	9.592	8.814
20-45	11.367	10.330	9.448	8.692
21-46	11.167	10.165	9.310	8.574
22-47	10.969	10.001	9.173	8.458
23-48	10.768	9.833	9.031	8.338
24-49	10.562	9.661	8.886	8.214
25-50	10.356	9.488	8.739	8.089
26-51	10.154	9.318	8.595	7.966
27-52	9.952	9.148	8.451	7.842
28-53	9.748	8.975	8.304	7.716
29-54	9.540	8.799	8.153	7.586
30-55	9.329	8.619	7.999	7.453
31-56	9.115	8.436	7.841	7.316
32-57	8.897	8.250	7.680	7.175
33-58	8.677	8.060	7.515	7.031
34-59	8.454	7.866	7.346	6.884
35-60	8.227	7.669	7.174	6.732
36-61	7.997	7.469	6.998	6.577
37-62	7.765	7.265	6.819	6.418
38-63	7.525	7.053	6.631	6.252
39-64	7.281	6.838	6.440	6.081
40-65	7.030	6.614	6.240	5.901
41-66	6.776	6.388	6.037	5.718
42-67	6.522	6.159	5.831	5.532
43-68	6.266	5.929	5.622	5.343
44-69	6.008	5.696	5.411	5.150
45-70	5.749	5.460	5.195	4.953
46-71	5.488	5.222	4.978	4.753
47-72	5.228	4.983	4.758	4.551
48-73	4.970	4.746	4.539	4.348
49-74	4.716	4.511	4.322	4.146
50-75	4.472	4.285	4.112	3.951
51-76	4.245	4.074	3.916	3.768
52-77	4.019	3.864	3.720	3.586
53-78	3.787	3.648	3.518	3.396
54-79	3.540	3.416	3.299	3.189
55-80	3.291	3.180	3.076	2.978
56-81	3.051	2.953	2.861	2.774

# LIFE-ANNUITIES.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
57-82	2.820	2.733	2.651	2.574
58-83	2.608	2.530	2.457	2.388
59-84	2.446	2.376	2.310	2.247
60-85	2.297	2.234	2.174	2.118
61-86	2.162	2.105	2.051	2.000
62-87	2.036	1.985	1.937	1.891
63-88	1.932	1.886	1.843	1.802
64-89	1.790	1.751	1.714	1.678
65-90	1.606	1.575	1.544	1.515
66-91	1.354	1.330	1.307	1.285
67-92	1.083	1.067	1.050	1.035
68-93	0.770	0.760	0.750	0.740
69-94	0.497	0.491	0.485	0.480
70-95	0.227	0.224	0.221	0.220
71-96	0.000	0.000	0.000	0.000

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
35-65	7.177	6.747	6.360	6.010
36-66	6.922	6.520	6.156	5.827
37-67	6.663	6.288	5.948	5.639
38-68	6.401	6.052	5.735	5.446
39-69	6.137	5.813	5.518	5.249
40-70	5.871	5.571	5.298	5.047
41-71	5.605	5.329	5.076	4.844
42-72	5.341	5.087	4.854	4.640
43-73	5.081	4.848	4.634	4.456
44-74	4.826	4.613	4.417	4.235
45-75	4.580	4.386	4.206	4.040
46-76	4.348	4.171	4.006	3.853
47-77	4.115	3.954	3.805	3.666
48-78	3.875	3.731	3.596	3.469
49-79	3.619	3.490	3.369	3.256
50-80	3.362	3.247	3.140	3.039
51-81	3.117	3.015	2.920	2.829
52-82	2.882	2.792	2.707	2.627
53-83	2.665	2.585	2.510	2.438
54-84	2.501	2.428	2.360	2.295
55-85	2.349	2.284	2.222	2.164
56-86	2.211	2.153	2.097	2.044
57-87	2.082	2.030	1.980	1.932
58-88	1.957	1.928	1.883	1.841
59-89	1.828	1.788	1.750	1.713
60-90	1.641	1.608	1.577	1.547
61-91	1.382	1.358	1.334	1.311
62-92	1.105	1.088	1.071	1.055
63-93	0.785	0.774	0.764	0.754
64-94	0.506	0.500	0.494	0.489
65-95	0.230	0.228	0.226	0.224
66-96	0.000	0.000	0.000	0.000

TABLE XIII.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *thirty* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1-31	10.605	9.438	8.483	7.691
2-32	12.203	10.865	9.767	8.855
3-33	12.743	11.355	10.213	9.263
4-34	13.061	11.651	10.488	9.518
5-35	13.136	11.732	10.572	9.602
6-36	13.207	11.812	10.656	9.687
7-37	13.195	11.819	10.676	9.715
8-38	13.122	11.772	10.648	9.701
9-39	12.981	11.665	10.565	9.637
10-40	12.791	11.513	10.442	9.537
11-41	12.580	11.342	10.302	9.420
12-42	12.363	11.165	10.156	9.298
13-43	12.144	10.985	10.007	9.173
14-44	11.918	10.799	9.852	9.042
15-45	11.687	10.607	9.690	8.905
16-46	11.448	10.408	9.522	8.762
17-47	11.210	10.208	9.353	8.617
18-48	10.975	10.011	9.186	8.473
19-49	10.746	9.818	9.021	8.332
20-50	10.523	9.630	8.861	8.195
21-51	10.313	9.454	8.712	8.067
22-52	10.111	9.284	8.568	7.944
23-53	9.905	9.111	8.421	7.818
24-54	9.696	8.934	8.270	7.688
25-55	9.484	8.754	8.116	7.555
26-56	9.269	8.570	7.958	7.419
27-57	9.051	8.383	7.797	7.279
28-58	8.830	8.193	7.632	7.135
29-59	8.605	7.999	7.464	6.988
30-60	8.378	7.802	7.292	6.837
31-61	8.147	7.601	7.116	6.682
32-62	7.914	7.397	6.937	6.524
33-63	7.673	7.186	6.750	6.359
34-64	7.429	6.971	6.559	6.189

TABLE XIV.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *thirty-five* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1-36	10.104	9.047	8.173	7.442
2-37	11.600	10.302	9.390	8.551
3-38	12.087	10.858	9.800	9.028
4-39	12.362	11.097	10.043	9.157
5-40	12.405	11.150	10.102	9.219
6-41	12.446	11.203	10.163	9.283
7-42	12.412	11.190	10.165	9.296
8-43	12.325	11.130	10.124	9.270
9-44	12.174	11.012	10.031	9.197
10-45	11.976	10.851	9.900	9.088
11-46	11.756	10.697	9.774	8.962
12-47	11.525	10.481	9.592	8.827
13-48	11.288	10.234	9.425	8.686
14-49	11.045	10.080	9.252	8.538
15-50	10.799	9.872	9.076	8.386
16-51	10.554	9.665	8.899	8.234
17-52	10.313	9.461	8.724	8.083

LIFE-ANNUITIES.

Ages.	Value at 4 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
18-53	10.076	9.260	8.552	7.934
19-54	9.845	9.063	8.383	7.788
20-55	9.617	8.860	8.216	7.643
21-56	9.394	8.679	8.053	7.502
22-57	9.174	8.491	7.891	7.362
23-58	8.951	8.309	7.725	7.218
24-59	8.725	8.124	7.556	7.070
25-60	8.495	7.906	7.383	6.919
26-61	8.263	7.704	7.207	6.764
27-62	8.028	7.499	7.027	6.605
28-63	7.785	7.286	6.839	6.439
29-64	7.539	7.069	6.648	6.268
30-65	7.286	6.844	6.447	6.089
31-66	7.028	6.615	6.243	5.905
32-67	6.768	6.382	6.033	5.717
33-68	6.504	6.146	5.820	5.524
34-69	6.239	5.906	5.603	5.326
35-70	5.971	5.663	5.382	5.125
36-71	5.703	5.419	5.159	4.920
37-72	5.435	5.174	4.934	4.714
38-73	5.169	4.930	4.710	4.507
39-74	4.908	4.690	4.488	4.301
40-75	4.656	4.457	4.272	4.101
41-76	4.420	4.238	4.060	3.912
42-77	4.184	4.019	3.865	3.722
43-78	3.943	3.794	3.655	3.525
44-79	3.685	3.552	3.428	3.312
45-80	3.426	3.308	3.197	3.093
46-81	3.176	3.072	2.973	2.881
47-82	2.936	2.843	2.756	2.673
48-83	2.714	2.632	2.554	2.481
49-84	2.544	2.470	2.400	2.334
50-85	2.388	2.322	2.258	2.198
51-86	2.248	2.188	2.131	2.077
52-87	2.117	2.063	2.012	1.963
53-88	2.008	1.960	1.914	1.870
54-89	1.858	1.817	1.778	1.740
55-90	1.666	1.633	1.601	1.570
56-91	1.402	1.377	1.353	1.330
57-92	1.120	1.102	1.085	1.069
58-93	0.794	0.784	0.773	0.763
59-94	0.511	0.505	0.499	0.494
60-95	0.233	0.230	0.228	0.226
61-96	0.000	0.000	0.000	0.000

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
5-45	11.597	10.500	9.571	8.778
6-46	11.610	10.528	9.609	8.823
7-47	11.550	10.491	9.589	8.815
8-48	11.435	10.404	9.524	8.767
9-49	11.260	10.263	9.409	8.673
10-50	11.044	10.085	9.260	8.548
11-51	10.816	9.894	9.100	8.411
12-52	10.582	9.693	8.934	8.270
13-53	10.344	9.497	8.763	8.123
14-54	10.100	9.290	8.586	7.970
15-55	9.851	9.077	8.403	7.812
16-56	9.595	8.858	8.214	7.648
17-57	9.340	8.639	8.024	7.481
18-58	9.089	8.422	7.835	7.316
19-59	8.841	8.207	7.648	7.153
20-60	8.597	7.995	7.463	6.990
21-61	8.357	7.787	7.281	6.830
22-62	8.119	7.580	7.100	6.670
23-63	7.874	7.365	6.910	6.503
24-64	7.626	7.147	6.717	6.331
25-65	7.370	6.920	6.515	6.151
26-66	7.110	6.689	6.309	5.966
27-67	6.847	6.454	6.098	5.776
28-68	6.581	6.215	5.883	5.581
29-69	6.313	5.973	5.664	5.383
30-70	6.043	5.729	5.442	5.180
31-71	5.772	5.483	5.218	4.974
32-72	5.502	5.236	4.992	4.767
33-73	5.235	4.991	4.766	4.559
34-74	4.973	4.749	4.543	4.353
35-75	4.720	4.516	4.327	4.152
36-76	4.481	4.295	4.123	3.962
37-77	4.242	4.073	3.916	3.770
38-78	3.996	3.844	3.702	3.570
39-79	3.734	3.598	3.471	3.352
40-80	3.469	3.349	3.236	3.130
41-81	3.216	3.109	3.009	2.914
42-82	2.973	2.878	2.789	2.705
43-83	2.750	2.666	2.587	2.511
44-84	2.581	2.505	2.433	2.365
45-85	2.424	2.356	2.291	2.230
46-86	2.282	2.221	2.162	2.107
47-87	2.148	2.093	2.041	1.991
48-88	2.036	1.987	1.941	1.895
49-89	1.882	1.840	1.800	1.761
50-90	1.685	1.651	1.619	1.590
51-91	1.417	1.391	1.367	1.343
52-92	1.130	1.113	1.095	1.079
53-93	0.801	0.790	0.780	0.770
54-94	0.515	0.509	0.503	0.498
55-95	0.234	0.232	0.230	0.228
56-96	0.000	0.000	0.000	0.000

TABLE XV.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age forty years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1-41	9.523	8.585	7.800	7.135
2-42	10.927	9.839	8.942	8.182
3-43	11.343	10.243	9.315	8.528
4-44	11.578	10.468	9.531	8.738

# LIFE-ANNUITIES.

## TABLE XVI.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *forty-five* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1-46	8.888	8.071	7.379	6.787
2-47	10.147	9.221	8.435	7.760
3-48	10.515	9.506	8.759	8.063
4-49	10.697	9.744	8.932	8.230
5-50	10.679	9.742	8.941	8.248
6-51	10.664	9.745	8.956	8.271
7-52	10.586	9.690	8.919	8.248
8-53	10.458	9.591	8.841	8.188
9-54	10.276	9.442	8.718	8.085
10-55	10.055	9.256	8.560	7.951
11-56	9.814	9.052	8.386	7.801
12-57	9.566	8.839	8.203	7.643
13-58	9.312	8.622	8.015	7.479
14-59	9.053	8.399	7.821	7.310
15-60	8.790	8.170	7.622	7.135
16-61	8.521	7.935	7.416	6.953
17-62	8.252	7.700	7.208	6.770
18-63	7.981	7.462	6.998	6.583
19-64	7.714	7.226	6.780	6.396
20-65	7.444	6.986	6.576	6.205
21-66	7.177	6.749	6.364	6.015
22-67	6.911	6.512	6.151	5.824
23-68	6.643	6.271	5.934	5.628
24-69	6.372	6.027	5.713	5.427
25-70	6.099	5.780	5.489	5.223
26-71	5.826	5.532	5.263	5.016
27-72	5.554	5.283	5.035	4.807
28-73	5.284	5.036	4.808	4.597
29-74	5.019	4.792	4.583	4.390
30-75	4.764	4.557	4.365	4.188
31-76	4.523	4.335	4.160	3.997
32-77	4.282	4.111	3.952	3.804
33-78	4.035	3.881	3.737	3.602
34-79	3.771	3.633	3.505	3.384
35-80	3.506	3.383	3.268	3.160
36-81	3.251	3.142	3.040	2.944
37-82	3.005	2.909	2.818	2.733
38-83	2.779	2.694	2.613	2.537
39-84	2.607	2.530	2.459	2.388
40-85	2.448	2.379	2.313	2.251
41-86	2.304	2.241	2.182	2.126
42-87	2.168	2.113	2.060	2.009
43-88	2.055	2.006	1.959	1.914
44-89	1.901	1.859	1.818	1.779
45-90	1.702	1.668	1.635	1.604
46-91	1.431	1.405	1.380	1.356
47-92	1.140	1.122	1.105	1.089
48-93	0.808	0.797	0.786	0.776
49-94	0.519	0.512	0.507	0.501
50-95	0.235	0.233	0.231	0.229
51-96	0.000	0.000	0.000	0.000

## TABLE XVII.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *fifty* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1-51	8.171	7.479	6.885	6.370
2-52	9.300	8.520	7.848	7.264
3-53	9.611	8.815	8.128	7.529
4-54	9.751	8.957	8.269	7.668
5-55	9.707	8.931	8.256	7.665
6-56	9.659	8.902	8.241	7.662
7-57	9.549	8.817	8.176	7.612
8-58	9.395	8.691	8.073	7.527
9-59	9.191	8.519	7.927	7.403
10-60	8.952	8.314	7.750	7.250
11-61	8.696	8.092	7.557	7.081
12-62	8.433	7.863	7.357	6.905
13-63	8.161	7.625	7.147	6.719
14-64	7.884	7.381	6.931	6.527
15-65	7.597	7.127	6.705	6.325
16-66	7.304	6.866	6.472	6.115
17-67	7.012	6.604	6.236	5.903
18-68	6.721	6.343	6.001	5.689
19-69	6.434	6.084	5.766	5.476
20-70	6.149	5.826	5.532	5.262
21-71	5.870	5.572	5.300	5.050
22-72	5.595	5.321	5.070	4.840
23-73	5.323	5.072	4.841	4.628
24-74	5.056	4.827	4.615	4.419
25-75	4.799	4.589	4.396	4.216
26-76	4.556	4.365	4.188	4.024
27-77	4.313	4.140	3.979	3.829
28-78	4.064	3.908	3.762	3.626
29-79	3.798	3.659	3.528	3.406
30-80	3.530	3.406	3.200	3.181
31-81	3.274	3.164	3.060	2.963
32-82	3.027	2.929	2.838	2.751
33-83	2.800	2.713	2.632	2.555
34-84	2.627	2.549	2.476	2.406
35-85	2.468	2.398	2.331	2.268
36-86	2.323	2.260	2.200	2.143
37-87	2.187	2.130	2.077	2.026
38-88	2.072	2.022	1.974	1.929
39-89	1.915	1.872	1.832	1.792
40-90	1.713	1.679	1.646	1.614
41-91	1.439	1.413	1.388	1.364
42-92	1.146	1.128	1.111	1.094
43-93	0.811	0.800	0.790	0.779
44-94	0.521	0.515	0.509	0.503
45-95	0.236	0.234	0.232	0.230
46-96	0.000	0.000	0.000	0.000

# LIFE-ANNUITIES.

TABLE XVIII.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *fifty-five* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1—56	7.412	6.843	6.346	5.911
2—57	8.392	7.756	7.199	6.709
3—58	8.630	7.986	7.421	6.922
4—59	8.712	8.075	7.514	7.017
5—60	8.629	8.011	7.466	6.982
6—61	8.542	7.944	7.415	6.945
7—62	8.400	7.828	7.319	6.865
8—63	8.214	7.669	7.184	6.750
9—64	7.984	7.470	7.010	6.598
10—65	7.718	7.236	6.803	6.414
11—66	7.437	6.987	6.581	6.215
12—67	7.149	6.730	6.309	6.009
13—68	6.857	6.468	6.116	5.796
14—69	6.562	6.202	5.876	5.578
15—70	6.264	5.933	5.631	5.355
16—71	5.964	5.660	5.382	5.127
17—72	5.667	5.389	5.133	4.899
18—73	5.378	5.123	4.889	4.673
19—74	5.098	4.866	4.651	4.453
20—75	4.831	4.619	4.424	4.242
21—76	4.583	4.391	4.212	4.046
22—77	4.339	4.104	4.001	3.850
23—78	4.087	3.930	3.783	3.646
24—79	3.820	3.679	3.548	3.424
25—80	3.550	3.425	3.308	3.198
26—81	3.292	3.181	3.077	2.979
27—82	3.043	2.945	2.853	2.765
28—83	2.815	2.728	2.646	2.568
29—84	2.641	2.563	2.489	2.418
30—85	2.481	2.411	2.344	2.280
31—86	2.336	2.272	2.212	2.154
32—87	2.198	2.142	2.088	2.036
33—88	2.083	2.033	1.985	1.939
34—89	1.925	1.882	1.841	1.802
35—90	1.723	1.688	1.654	1.622
36—91	1.446	1.422	1.395	1.371
37—92	1.152	1.134	1.116	1.099
38—93	0.815	0.804	0.793	0.783
39—94	0.523	0.517	0.511	0.505
40—95	0.237	0.235	0.233	0.231
41—96	0.000	0.000	0.000	0.000

TABLE XIX.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *sixty* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1—61	6.571	6.123	5.725	5.372
2—62	7.391	6.894	6.452	6.059
3—63	7.545	7.048	6.605	6.209
4—64	7.562	7.076	6.641	6.251
5—65	7.429	6.963	6.546	6.171
6—66	7.290	6.846	6.447	6.087
7—67	7.104	6.684	6.306	5.963
8—68	6.884	6.490	6.134	5.811
9—69	6.628	6.262	5.929	5.626
10—70	6.347	6.008	5.700	5.418
11—71	6.056	5.744	5.460	5.199
12—72	5.763	5.478	5.216	4.976
13—73	5.473	5.212	4.972	4.751
14—74	5.188	4.950	4.731	4.528
15—75	4.911	4.695	4.495	4.310
16—76	4.649	4.452	4.270	4.101
17—77	4.388	4.210	4.045	3.892
18—78	4.123	3.964	3.815	3.677
19—79	3.846	3.704	3.571	3.447
20—80	3.569	3.443	3.325	3.214
21—81	3.307	3.195	3.091	2.992
22—82	3.057	2.958	2.865	2.777
23—83	2.828	2.740	2.657	2.579
24—84	2.653	2.574	2.499	2.429
25—85	2.492	2.421	2.354	2.290
26—86	2.346	2.282	2.221	2.163
27—87	2.208	2.151	2.096	2.044
28—88	2.091	2.041	1.992	1.946
29—89	1.933	1.889	1.848	1.808
30—90	1.729	1.694	1.660	1.628
31—91	1.451	1.425	1.400	1.376
32—92	1.155	1.137	1.119	1.102
33—93	0.817	0.806	0.795	0.785
34—94	0.524	0.518	0.512	0.506
35—95	0.238	0.235	0.233	0.231
36—96	0.000	0.000	0.000	0.000

TABLE XX.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *sixty-five* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1—66	5.633	5.295	4.996	4.728
2—67	6.266	5.896	5.599	5.276
3—68	6.330	5.965	5.641	5.352
4—69	6.277	5.924	5.611	5.332
5—70	6.102	5.768	5.472	5.209
6—71	5.925	5.610	5.331	5.084
7—72	5.714	5.418	5.157	4.929

# LIFE-ANNUITIES.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
8-73	5.480	5.204	4.963	4.752
9-74	5.225	4.969	4.747	4.556
10-75	4.962	4.725	4.522	4.350
11-76	4.707	4.487	4.301	4.148
12-77	4.449	4.368	4.195	3.943
13-78	4.185	4.022	3.871	3.729
14-79	3.904	3.759	3.624	3.497
15-80	3.621	3.492	3.372	3.259
16-81	3.348	3.235	3.128	3.028
17-82	3.087	2.987	2.893	2.804
18-83	2.849	2.760	2.677	2.598
19-84	2.663	2.589	2.513	2.442
20-85	2.503	2.431	2.364	2.299
21-86	2.354	2.290	2.220	2.171
22-87	2.216	2.158	2.104	2.051
23-88	2.099	2.048	1.999	1.953
24-89	1.939	1.895	1.854	1.814
25-90	1.734	1.699	1.665	1.633
26-91	1.457	1.429	1.404	1.379
27-92	1.158	1.140	1.122	1.105
28-93	0.819	0.808	0.797	0.786
29-94	0.525	0.519	0.513	0.507
30-95	0.238	0.236	0.234	0.231
31-96	0.000	0.000	0.000	0.000

TABLE XXI.

Shewing the value of an annuity on the joint continuance of two lives, according to the Northampton Table of Observations.

Difference of age *seventy* years.

Ages.	Value at 3 per cent.	Value at 4 per cent.	Value at 5 per cent.	Value at 6 per cent.
1-71	4.611	4.380	4.169	3.976
2-72	5.061	4.814	4.588	4.380
3-73	5.051	4.811	4.591	4.389
4-74	4.953	4.726	4.516	4.323
5-75	4.768	4.557	4.362	4.181
6-76	4.599	4.493	4.221	4.053
7-77	4.402	4.222	4.055	3.899
8-78	4.180	4.016	3.864	3.722
9-79	3.921	3.775	3.638	3.510
10-80	3.647	3.517	3.395	3.281
11-81	3.380	3.264	3.156	3.054
12-82	3.122	3.020	2.924	2.833
13-83	2.884	2.794	2.709	2.628
14-84	2.703	2.622	2.545	2.472
15-85	2.535	2.462	2.393	2.327
16-86	2.380	2.315	2.253	2.194
17-87	2.235	2.177	2.121	2.069
18-88	2.112	2.061	2.012	1.965
19-89	1.948	1.904	1.862	1.822
20-90	1.739	1.704	1.670	1.638
21-91	1.459	1.432	1.407	1.382
22-92	1.170	1.142	1.124	1.107
23-93	0.820	0.809	0.798	0.788
24-94	0.526	0.520	0.514	0.508
25-95	0.238	0.236	0.234	0.232
26-96	0.000	0.000	0.000	0.000

*Life-Annuities, payable half-yearly.* These are more valuable than life-annuities payable yearly, on the two following accounts. First, the annuitant in this case receives one-half of every payment half a year sooner; and, secondly, he has the chance of receiving one half-year's payment more than if he had been paid yearly. Mr. Simpson, in his *Select Exercises*, p. 283, observes, that the value of these two advantages put together (let the rate of interest and the number of lives on which the annuity depends be what they will) will always amount to  $\frac{1}{2}$  of a year's purchase; and that if the payments are to be made *quarterly*, these advantages will be always worth  $\frac{3}{4}$  of a year's purchase. But Dr. Price, in an essay in the *Philosophical Transactions*, vol. lxxi. part 1. p. 109, has stated the differences of value between life-annuities, as they are made payable yearly, half-yearly, or quarterly, with more precision; and from his investigations it appears, that a *fifth* of a year's purchase is generally an addition more than sufficient to the yearly value of an annuity, in order to obtain its value, payable half-yearly; and *three-tenths* of a year's purchase, in order to obtain its value, payable quarterly.

Dr. Price has given the following short and easy theorems for finding in all cases these differences of value.

Let  $r$  be (not  $1l$ . with its interest, but merely) the interest of  $1l$ . for a year,  $n$  the complement of a given life;  $y$ ,  $h$ ,  $q$ ,  $m$ , the values respectively of an annuity *certain* for  $n$  years, payable yearly, half-yearly, quarterly, or momentarily (see the article ANNUITIES);  $P$  the perpetuity;  $Y$  the present value of an annuity on a life, whose complement is  $n$ , payable yearly;  $H$  the value of the same annuity payable half-yearly;  $Q$  the value of the same annuity payable quarterly; and  $M$  its value payable momentarily.

$$\text{Then, } Y = P - \frac{1+r}{rn} \times y$$

$$H = P - \frac{r}{nr} \times h$$

$$Q = P - \frac{r}{nr} \times q$$

$$M = P - \frac{m}{nr}$$

*Example.*—Let the life supposed be of the age of 36. The complement of such a life is (by what has been already said) 50, according to M. De Moivre's hypothesis; therefore,  $n$  will be 50. Let the rate of interest be *4 per cent.*, or  $r = 0.04$ ,  $P = 25$ ,  $Y = 21.482$  (see Table III. ANNUITIES),  $h = 21.549$  (by the theorems given under ANNUITIES),  $q = 21.582$ , (by the same theorems, and  $m = 21.616$ . Therefore,

$$Y = 25 - \frac{1.04}{50 \times 0.04} \times 21.482 = 13.829$$

$$H = 25 - \frac{1.02}{50 \times 0.04} \times 21.949 = 14.010$$

$$Q = 25 - \frac{1.01}{50 \times 0.04} \times 21.582 = 14.101$$

$$M = 25 - \frac{21.616}{50 \times .04} = 14.191$$

These theorems, though founded on the hypothesis of an equal decrement of life, give the differences between the yearly,

yearly, half-yearly, and quarterly values, almost exactly the same, whether those values be deduced from real observations or from this hypothesis.

For determining the differences between the values of annuities on two joint lives, when payable half-yearly, quarterly, or momentarily, Mr. Morgan, in the 6th edition of Dr. Price's Treatise on Reverfionary Payments, (note L, appendix,) has given the following theorems. Let  $b$ ,  $q$ ,  $m$ , denote the same quantities as above for  $t$  years. Let  $n$  be the complement of the younger, and  $t$  the complement of the older life. Let  $r$  also be the interest of 1*l.* for a year, and  $V$  the perpetuity: then will the value of the annuity be

$$V - \frac{V + \frac{1}{2}}{n} \times n - t - \frac{1}{2} - 2V \times \frac{b}{t} + 2V, \text{ or } V - \frac{V + \frac{1}{4}}{n} \times n - t - \frac{1}{4} - 2V \times \frac{q}{t} + 2V, \text{ or } V - \frac{V}{n} \times n - t - 2V \times \frac{m}{t} + 2V, \text{ according as it is payable}$$

half-yearly, quarterly, or momentarily.

Thus, if the ages of the two lives be 20 and 36 years, the value of the annuity at 4*l. per cent.*, when payable yearly, may be found by the theorem in the preceding article to be equal to 11.227; and its value, when payable either half-yearly, quarterly, or momentarily, may be found by these theorems to be either 11.427, 11.565, or 11.629. If the ages of both lives be 36, these values respectively will be 10.394, 10.600, 10.703, and 10.808. It may be observed, that the differences between the values of two joint lives are always greater than the differences between the values of the single lives, when payable at shorter intervals than a year; and therefore, that the addition, in this case, to be made to the value of an annuity on the longest of two lives will be less than the addition to be made either to the joint or single lives.

*LIFE-Annuities secured by land*, differ from other life-annuities only in the single circumstance, that the annuitant, whenever he dies, is entitled to a payment for the time which has lapsed between the payment last due, and the moment of his death; whereas other annuities suppose nothing due for this time. In order to obtain the value of such an annuity,

$\frac{y}{2n}$  must be added to the expression in the first theorem, if it is payable yearly;  $\frac{b}{4n}$  must be added to the expression in the

second theorem, if it is payable half-yearly; and  $\frac{q}{8n}$  must be added to the expression in the third theorem, if the annuity is payable quarterly. For since  $\frac{1}{n}$  is the probability

that a life, whose complement is  $n$ , fails in any year of its duration, and it is an equal chance whether more or less than half the yearly, half-yearly, or quarterly payment is due at the death of the annuitant, it follows that the additional

value of the annuity will be either  $\frac{1}{n} \times \frac{y}{2}$ , or  $\frac{1}{n} \times \frac{1}{2} \times \frac{b}{2}$ , or  $\frac{1}{n} \times \frac{1}{2} \times \frac{q}{4}$ , according as the same is payable either yearly, half-yearly, or quarterly. See Dr. Price's Essay, before quoted.

The value, therefore, in the last example, of an annuity payable yearly on a life aged 36, being 13.829; its value, Vol. XX.

if secured by land, or to be enjoyed to the last moment of life, will be  $13.829 + \frac{21.482}{100} = 14.043$ ; if secured by land, and payable half-yearly, its value will be  $14.010 + \frac{21.549}{200} = 14.117$ ; if secured by land, and payable quarterly, its value will be  $14.101 + \frac{21.582}{400} = 14.155$ .

*LIFE-Annuities*, in the contemplation of *Law*, are in some cases sold and purchased in an improvident manner, and with great privacy; and therefore, in order to throw some check on transactions of this kind, the statute 17 Geo. III. c. 26. has directed, that upon the sale of any life-annuity of more than the value of 10*l. per annum*, (unless on a sufficient pledge of lands in fee-simple, or stock in the public funds,) the true consideration, which shall be in money only, shall be set forth and described in the security itself; and a memorial of the date of the security, of the names of the parties, *cestui que trusts*, *cestui que vies*, and witnesses, and of the consideration money, shall, within 21 days after its execution, be inrolled in the court of chancery, else the security shall be null and void; and, in case of collusive practices respecting the consideration, the court, in which any action is brought, or judgment obtained upon such collusive security, may order the same to be annulled; and the judgment, if any, to be vacated; and also all contracts for the purchase of annuities from infants shall remain utterly void, and be incapable of confirmation after such infants arrive to the age of maturity. By 29 Geo. III. c. 41. § 27, and other acts that respect life-annuities, oath of an annuitant's life may be made before a justice of the peace, who shall give a certificate thereof, without fee or stamp-duty, in order to entitle such person to receive his annuity.

*LIFE-Boat*. See BOAT.

*LIFE*, Complement of. See COMPLEMENT.

*LIFE Estates*, in *Law*, are such estates of freehold as are only for life. (See ESTATE.) Of these some are *conventional*, and others merely *legal*. Estates for life of the first kind, expressly created by deed or grant, are where a lease is made of lands or tenements to a man to hold for the term of his own life, or that of any other person, or for more lives than one; in any of which cases he is styled tenant for life; only when he holds the estate by the life of another, he is usually called tenant *pur autre vie*. These estates for life are like inheritances, of a feudal nature; and for some time were the highest estate that any man could have in a feud, which was not in its original hereditary. They are given or conferred by the same feudal rights and solemnities, the same investiture or livery of seisin, as fees themselves are; and they are held by fealty, if demanded, and such conventional rents and services, as the lord or lessor, and his tenant or lessee, have agreed on. Estates for life may be created, not only by express words, but also by a general grant, without defining or limiting any specific estate. As if we grant to A.B. the manor of Dale, this makes him tenant for life. (Co. Litt. 41.) Such estates for life will, generally speaking, endure as long as the life for which they are granted; but there are some estates for life, which may determine upon future contingencies, before the life for which they are created expires; as an estate granted to a woman during her widow-hood, or to a man till he be promoted to a benefice. These, while they subsist, are reckoned estates for life; because the time for which they will endure being uncertain, they may by possibility last for life, if the contingencies upon which they determine do not sooner happen.

The incidents to an estate for life are principally the following; and they are applicable not only to that species of tenants for life which are expressly created by deed, but also to those which are created by act or operation of law.

1. Every tenant for life, unless restrained by covenant or agreement, may of common right take upon the land demised to him reasonable cisterns, or botes. (Co. Litt. 43.) But he is not permitted to cut down timber or do other waste upon the premises. (Id. 53.) 2. Tenant for life, or his representatives, shall not be prejudiced by any sudden determination of his estate, because such a determination is contingent and uncertain. (Ibid. 55.) The advantages also of emblements are particularly extended to the parochial clergy by stat. 28 Hen. VIII. c. 11. 3. Another incident to estates for life relates to the under-tenants, or lessees. For they have the same, may greater indulgences than their lessors, the original tenants for life.

The second estate for life is of the *legal* kind, as contradistinguished from *conventional*; viz. that of tenant "in tail after possibility of issue extinct." This happens where one is tenant in special tail, and a person, from whose body the issue was to spring, dies without issue; or, having left issue, that issue becomes extinct; in either of these cases, the surviving tenant in special tail becomes tenant in tail after possibility of issue extinct. This estate must be created by the act of God: that is, by the death of that person out of whose body the issue was to spring; for no limitation, conveyance, or other human act can make it. A possibility of issue is always supposed to exist in law, unless extinguished by the death of the parties; even though the donees be each of them 100 years old. (Litt. § 34. Co. Litt. 28.) This estate is of an amphibious nature, partaking partly of an estate-tail, and partly of an estate for life. In truth, the tenant is only tenant for life, but with many of the privileges of a tenant in tail, as, not to be punishable for waste, &c. (Co. Litt. 27.); or, he is tenant in tail, with many of the restrictions of a tenant for life; as, to forfeit his estate if he alienates it in fee-simple (Ibid. 28.); whereas such alienation by tenant in tail, though voidable by the issue, is no forfeiture of the estate to the reversioner; who is not concerned in interest, till all possibility of issue be extinct. But, in general, the law looks upon this estate as equivalent to an estate for life only; and, as such, will permit this tenant to exchange his estate with a tenant for life: which exchange can only be made of estates that are equal in their nature. (Blackst. Com. b. ii.) See LEASE and TENANT.

LIFE, *Expectation of*. See EXPECTATION.

LIVES, *Insurance or Assurance on*. See ASSURANCES on Lives.

LIFE-*everlasting*, a name by which the *ilicbrysum*, or *gnaphalium* of botanical writers, is sometimes called. See CUDWEED.

LIFE *Guards*. See GUARDS.

LIFE *Preserver*, against drowning. Many different articles under this denomination have been made, particularly within these few years, by Collins, Spencer, Daniels, and others. But we believe they have all been copied, in a greater or less degree, from an apparatus constructed by John Bentley, esq. about the year 1797. It is however remarkable, that although he exhibited it in public several times, some very important parts of it seem to have escaped their notice, or at least their application of them to their own purposes. The following is his account of it.

The human body in most instances is of the same specific gravity as water; therefore, any substance which is lighter than water, being attached to the body, must cause it to float. The situation best adapted for fixing it is round the

body, immediately under the arms; and as it is desirable to be able to keep the head, neck, shoulders, and arms above water without any exertion, the article used must displace a bulk of water equal in weight to those parts. The next thing to be attended to, is to enable a person who cannot swim to make progress through the water. The hands and feet are too narrow to accomplish this without a knowledge of the art of swimming, therefore the fingers and feet must be artificially webbed. Thus the whole apparatus, which he calls a *nautilus*, consists of three distinct parts, and are to be thus constructed.

The *buoyant* is made of copper, in the form of a tube, to fit the round of the body, about six inches diameter, the seam brazed with hard solder. It should be made in three lengths, the ends quite flat, to fit each other exactly, so that, when put together, they form a ring or belt. This is in case of accident happening to one part by leaking, that it may not extend to the other two, which will be sufficient to prevent sinking. Each of these parts is sewed up in baize, with three strong tapes near the end of each piece, by which all of them are securely tied together. A flexible pipe, of the thickness of a quill, is inserted in each piece, from the upper side to the bottom, so that if any leakage happens, the water is readily drawn out by the mouth and discharged. The buoyant, thus prepared, must be securely tied with strong tapes, crossed round and over the shoulders, to prevent it getting down. It cannot get over the arms. When it is thus fixed, the body will, by its own gravity, be creft in the water, with the feet downwards, and will always retain this position unless force is applied to alter it, and which it will again recover when the force ceases to act. The second part, which is for the hands, is a pair of oiled silk gloves, which, after being made in the usual way, the fingers are opened to their full extent breadthways, and a piece of the same material sewed over them on the under side. Tapes are sewed at the top to tie them round the wrist.

The third part, being for the feet, is made thus: take a piece of half-inch waincot or mahogany, 11 inches long, and 10 inches wide. Cut it longitudinally into three pieces, two of them  $3\frac{1}{2}$  inches broad, and the other  $2\frac{1}{2}$  inches. Fasten them well together with two pair of brass hinges, and rule joints to fall and rise like a two-leaved table, the narrow piece being in the middle. On the under-side of the middle-piece, in the centre, a wooden turn buckle must be screwed, to prevent the side-pieces from falling down, when walking to or from the water. Two wooden flops are so fixed upon this piece as to prevent the sides, when down, coming to a right angle with the middle-piece, that the rising and falling may be duly performed with the action of the feet. To the upper side of the middle-piece, a common leather shoe, (to fit the person) must be fastened on with two screws through the sole, and near each end of this middle-piece two small holes are made with a centre-bit, through which good tapes are passed, to tie round the instep and over the foot. A pair of these must of course be provided, and a person thus equipped, being perfectly buoyant in water, and web-footed and web-fingered, will be able to outswim any other person, and may exist in the water as long as cold and hunger will permit.

By increasing the dimension of the buoyant, a proportionate quantity of provisions, or any other article, may be carried. The inventor has wrote a letter, and otherwise amused himself on the sea, with this apparatus, and believes he could cross from Dover to Calais in perfect safety. It is very convenient for crossing deep rivers, where there are neither boats nor bridges. It is procured at little expence, very portable,

portable, and put on in one minute. Persons provided with it, and being shipwrecked near the coast, would seldom be lost.

**LIFE-Rent**, in *Law*, a rent which a man receives for a term of life, or for sustentation of it. Skene.

**LIFFAMATULA**, in *Geography*, an island in the East Indian sea, 25 miles long and six broad. S. lat. 2°. E. long. 126° 18'.

**LIFFEY**, a river of Ireland, which rises in the north-western mountains of the county of Wicklow, and winding through the county of Kildare, it passes through the city of Dublin, and flows into Dublin bay. It derives its chief importance from the greatness of the city situated on its banks.

**LIFFORD**, the county-town of the county of Donegal, Ireland, a very small place, and at one extremity of that large county, but fixed upon to accommodate the judges and gentlemen of the bar: one mile W. from Strabane, and 101 N.W. by N. from Dublin.

**LIFRE**, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Rennes; 9 miles N.E. of Rennes. The place contains 2096, and the canton 8372 inhabitants, on a territory of 205 kilometres, in 7 communes.

**LIFTING-PIECES**, in a clock, are those parts which lift up and unlock the detents in the clock part.

**LIFTS**, in a *Ship*, ropes belonging to the yard-arms of all yards. Their use is to stop the yard-arms, *i. e.* to make the end of the yards hang higher or lower, as occasion serves. The top-sail lifts serve as sheets for the top-gallant yards, as well as for lifts to the top-fall yards. The hauling of these ropes is called *topping the lifts*: thus they say, *top a star-board*, or *top a port*, *i. e.* hale upon the starboard or larboard lift.

The lifts for the sprit-fall-yard are called *standing lifts*.

**LIGAMENT**, in its general sense, denotes any thing that ties or binds one part to another.

In which sense the ancients applied the word to membranes, skin, flesh, veins, and arteries; as being common ligaments. **LIGAMENT**, in its more proper signification, denotes a white, tough, solid, inflexible part, serving to inclose, and keep together the junctures of the body.

It has no conspicuous cavity, nor has it any sense, lest it should suffer on the moving of the bones. It is found very different, according to the different parts where it is used. It is harder than a membrane, yet softer than a cartilage: its principal use is to gird and strengthen the junctures, to prevent the dislocation of the bones, and even to fasten them together, when they have no articulation. It also serves as a covering to the tendons to separate them from the muscles, and to hold up the suspended entrails, lest their weight should throw them down. Such are the ligaments of the liver, the bladder, and matrix.

Ligaments are of different substances; some hard, others soft, membranous, nervous, and cartilaginous; as also of different figures and situations: some arise from bones, others from cartilages, and others from membranes.

**LIGAMENTUM**, in *Anatomy*, a ligament or part connecting organs together, and limiting their respective motions. In its most proper sense it denotes the fibrous bodies by which the bones are united at their articulations (see **JOINT**); but it is often applied to parts of an entirely different kind, as to the membranous folds which attach various organs in the chest and abdomen.

**LIGAMENTUM Annulare**, is a name given to different fibrous organs about the wrist and foot, which confine the tendons of the extensor and flexor muscles in their situation. For an account of the annular ligament of the carpus, see **EXTRE-**

**MITIES**. The annular ligament of the fore-arm, which confines the extensor tendons, is described in the articles **EXTENSOR communis digitorum**, and **FASCIA**. The description of the annular ligaments of the cord will be found under **FASCIA**.

**LIGAMENTUM Arteriosum**, is the fibrous cord connecting together the trunks of the pulmonary artery and the aorta, consisting of the remains of the canalis arteriosus of the fœtus. See **EMBRYO**.

**LIGAMENTUM Ciliare**, in the eye, is the white union of the sclerotica and choroid coats. See **EYE**.

**LIGAMENTA Coli**. See **INTESTINE**.

**LIGAMENTUM Denticulatum**, in the spinal marrow. See **BRAIN**.

**LIGAMENTUM Nucha**. See **HEAD**.

**LIGAMENTUM Fallopij**, or *Poupart's Ligament*. See **OBLIQUUS externus abdominis**.

**LIGAMENTUM Latum**, or *Suspensorium Hepatis*, lig. coronarium hepatis, et ligamenta lateralia hepatis. See **LIVER**.

**LIGAMENTUM Latum Uteri**, et lig. rotundum uteri. See the description of the uterus in the article **GENERATION**.

**LIGAMENTUM Teres** of the hip-joint. See **EXTREMITIES**.

**LIGAN**, in *Law*, denotes a wreck consisting of goods sunk in the sea, but tied to a cork or buoy, in order to be found again. Over these, as well as stotam and jetlam, the high-admiral hath jurisdiction, as they are in and upon the sea. 5 Rep. 106.

**LIGANI**, in *Geography*, a town of Turkish Armenia; 30 miles E. of Ipsira.

**LIGARDES**, a town of France, in the department of the Gers; 7 miles N.E. of Condom.

**LIGATURE**, among *Mystic Divines*, signifies a total suspension of the superior faculties, or intellectual powers of the soul. They pretend, that when the soul is arrived at a perfect contemplation, she remains deprived of all her operations, and ceases to act in order to be more ready and prepared to receive the impulse and communications of divine grace. This passive state of these contemplative people they call their *ligature*.

**LIGATURE** is also used for a state of impotency, in respect to venery, pretended to be caused by some charm, or witchcraft.

Kæmpfer tells of an uncommon kind of ligature, or knotting, in use among the people of Massacar, Java, Malaya, Siam, &c. By this charm, or spell, a man binds up a woman, and a woman a man, so as to put it out of their power to have to do with any other person; the man being thereby rendered impotent to any other woman, and all other men impotent with respect to the woman.

Some of their philosophers pretend that this ligature may be effected by the shutting of a lock, the drawing of a knot, or the sticking of a knife in the wall, at the point of time wherein the priest is joining a couple together; and that a ligature, thus effected, may be dissolved, by the spouse's urining through a ring. This piece of superstition is said to obtain also among the Christians of the East.

The same author tells us, that during the ceremony of marriage in Russia, he observed an old fellow lurking behind the church-door, and mumbling over a string of words; and, at the same time, cutting a long rod, which he held under his arm, into pieces; which, it seems, is a common practice at the marriages of great persons, and done with design to elude and counter-work any other person, that might possibly be inducing the ligature.

The secret of inducing a ligature is delivered by the same author, as he was taught it on the spot by one of their adepts; which, being a curiosity, we shall not scruple to add in his

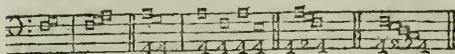
own words; not daring to make it speak English. "Puella amafium, vel conjux maritum ligaturus, abiterget a concubitus actus, priapum, indusio—ut feminis quantum potest excipiet. Hoc probe convolutum sub limine domus sue in terram sepeliat. Ibi quamdiu sepulchrum reliquerit, tandiu ejus hasta in nullius preterquam sui (ascinantis) servitium obediet, et prius ab hoc nexu non liberabitur quam ex clauetro hiniis liberetur ipsum lineum: vice versa, vir lecti sociam ligaturus, menstruatam ab eo lineum comburit; ex cineribus cum propria urina subactis, efformato figuram priapi, vel, si cineres incunucle fingende non sufficiant, eodem subigito cum parte terræ, quam recens permixerit. Formatam iconem caute exsiccat, siccamque asservato loco siccò, ne humorem contrahat. Quamdiu sic servaveris, omnes artus, dum ad scopam sociæ colliverint, momento contabescunt: idè vero dominus. Abrunum hunc prius humectato, quamdiu sic manebit, tandiu suspensio nexu priapi ipsi parebit, quin & alios quotquot sciamina properantes admittit."

M. Marshall mentions another ridiculous form of ligature, which he received from a Bramin at Hindoostan: "If," says he, "the little worm in the wood lukerara kara be cut into two, and the one part stirs, and the other not, if the stirring part be bruised, and given with half a beetle to a man, and the other half to a woman, the charm will keep each from ever having to do with any other person." Phil. Trans. No. 268.

LIGATURE, *Ligatura*, in the *Italian Music*, signifies a tying or binding together of notes.

Hence syncopes are often called ligatures, because they are made by the ligature of many notes. There is another sort of ligatures for breves, when there are many of these on different lines, or in different spaces, to be sung to one syllable.

To understand this, it must be observed, that only breves are capable of this species of ligature, because their figure admits of their being placed so close together, as to seem one character only, though placed on different degrees, unless there be occasion to place a femicircle either above or below them, to shew that they are tied. This kind of ligature regards common time only. Breves again must be considered as simple, as having a tail, and as being of different colours. First, if they be simple  $\square$  and ascend, they contain their natural quantity, *i. e.* each two semi-breves, as in example A. But if they descend, then each is equivalent to four semi-breves, if only two follow one another, as in B. If there are three or four following ones, the first and last contain each four semi-breves, and those in the middle but two, as in C.



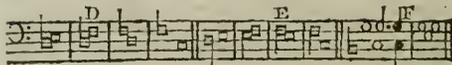
2 2 A 2 2 2 B

C

Secondly, if they have tails  $\square$ , and the tail be turned upwards, the breves contain only one measure, as well ascending as descending. See Ex D. But if it be marked downwards, the breve then contains its natural quantity. See Ex E. This species of ligature was invented only because the minim, being round, could not be used in this manner. And the femicircle was not at that time in use.

It may be here remarked, that ordinarily the first breve alone of every ligature has a tail, and that usually placed on the left side. Lastly, if they be of different colours, *i. e.* if the first be white, or open in the middle, and the second black,

the first contains a semi-breve, and the second a pointed minim. Example F.



I I I I I 2 2 2 2 2

These are the principal ligatures, besides which there are many others, for which see CHARACTER. See also LEGATURA.

LIGATURES, among *Printers*, are types consisting of two letters or characters joined together, as *B, S, ff, fl, fi*. The old editions of Greek authors are extremely full of ligatures; the ligatures of Stephens are, by much, the most beautiful.

Some editions have been lately printed without any ligatures at all; and there was a design to explode them quite out of printing. Had this succeeded, the finest ancient editions would, in time, have grown useless; and the reading of old manuscripts would have been rendered almost impracticable to the learned themselves.

LIGATURE, in *Surgery*, is the only means to be depended upon for putting a permanent stop to all bleedings from arteries of considerable size. In ordinary cases, the mouth of the bleeding vessel being exposed, is taken hold of with the tenaculum, or forceps, and tied. In some instances, the artery being only punctured, and not cut through, nor brought into view, the surgeon has first to cut down to the wounded portion of the vessel, and then pass a double ligature under it by means of an aneurism-needle, or an eye-probe. The latter instrument, having fulfilled its office, is to be removed by dividing the double ligature with a pair of scissors. One part of the ligature is then to be applied round the artery in a firm knot above the opening from which the blood issues, and the other below it. In cases of aneurism, the ligature is introduced under the artery in a very similar way.

Whoever is acquainted with the history of surgery, must be fully sensible of the immense advantage which the moderns have over the ancients in the familiar employment of ligatures for the stoppage of hemorrhage. But, although many years have elapsed since this important improvement in practice began, it was not till very lately that several most interesting circumstances, relative to the use of the ligature, were brought to light. For this elucidation of a difficult, though highly momentous, subject to the practical surgeon, we are indebted to the judgment, accuracy, and talents of Dr. J. F. D. Jones, whose Treatise on Hemorrhage demands the earnest attention of every enlightened practitioner. Before this work appeared, scarcely any surgeon had a just conception of the manner in which ligatures effected the suppression of hemorrhage; nor were the principles on which they ought to be made and applied properly understood. One of the first and most material effects of a ligature applied to an artery, is to produce a division of the middle and internal coats of the vessel. This fact was communicated to Dr. Jones by Mr. Thomson of Edinburgh, and is alleged to have been known to the celebrated M. Default of Paris. The inner coats of the artery, thus cut through by the pressure of the ligature, are in the stiffest state for inflaming and effusing coagulable lymph, and, in short, for undergoing that process, by which the permanent closure of the vessel is to be accompanied. Hence, ligatures should not be thick, irregular, and clumsy; but small,

ish, firm, and round; and they should be applied with tightness, as it is of consequence that they divide the inner coats of the artery, and the fear of their cutting the vessel quite through is destitute of foundation. These, however, and numerous other particulars, having been explained in a previous part of this Cyclopædia, we must avoid unnecessary repetition, by referring the reader to the article HEMORRHIAGE.

**LIGEANCE, LIGENTIA**, in *Law*, is the true and faithful obedience of a subject to his sovereign; and is also applied to the dominion or territory of the liege lord: thus children are said to be born in or out of the ligeance of the king, &c. Stat. 25 Edw. III. See ALLEGIANCE and LEIGE.

**LIGHT**, that sensation occasioned in the mind by the view of luminous bodies; or that property in bodies, whereby they are fitted to excite those sensations in us.

**LIGHT** is also used to denote a certain action of the luminous body, on a medium between it and the eye; by means of which, some suppose the one to act on the other. Thus they call *secondary*, or *derivative* light: to distinguish it from that of luminous bodies, which is called *primary*, or *innate*.

Aristotle explains the nature of light, by supposing some bodies to be transparent, as air, water, ice, &c.; but since, in the night-time, we do not see any thing through those bodies, he says, they are only transparent potentially; whereas, in the day, they become really and actually transparent: and since it is light alone that can reduce that power into act, he defines light to be the act of a transparent body, considered as such. He adds, that light is not fire, nor is it any thing bodily radiating from the luminous body, and transmitted through the transparent one; but the mere presence of fire, or some other luminous body, at the transparent one.

This is Aristotle's doctrine of light, which his followers mistaking, have charged on him another, very different; making light and colours to be qualities of the luminous and coloured bodies themselves, and in all respects like those sensations which they occasion in us: adding, that things lucid, or coloured, could not produce any sensation in us, unless they had something similar in themselves, since  *nihil dat quod in se non habet*.

But the sophism is apparent; for we find, that a needle, in pricking the flesh, gives us pain, which nobody ever imagined to exist in the needle. But that it is not necessary there should be any similitude between the quality of the object, and the sensation it produces, appears still more evident from a glass prism, which is found to exhibit blue, yellow, red, and other colours extremely vivid; and yet no body will say there is any thing in the glass prisms like to those sensations.

The Cartesians have refined considerably on this notion; and own that light, as it exists in the luminous body, is nothing but a power or faculty of exciting in us a very clear and vivid sensation; adding, that what is required to the perception of light, is, that we be so formed, as to be capable of such sensations; that in the hidden pores of transparent bodies, there be a certain subtle matter, which, by reason of its exceeding smallness, may penetrate even glass, and yet be strong enough to shake certain capillaments at the bottom of the eye; and lastly, that this matter be impelled by the luminous body, so as to move the organ of sight.

Primary light, therefore, they say, consists in a certain motion of the particles of the luminous body, whereby they are enabled to propel, every way, the materia subtilis,

lodged in the pores of transparent bodies; and secondary or derivative light, in a conatus to motion, or an inclination of that matter to recede from the centre of the luminous body in right lines.

Father Malebranche explains the nature of light, from a supposed analogy between it and sound.

Thus he supposes all the parts of a luminous body are in a rapid motion, which, by very quick pulses, is continually compressing the subtle matter between the luminous body and the eye, and excites vibrations of pressure. As these vibrations are greater, the body appears more luminous; and as they are more quick, or more slow, the body is of this or that colour.

This hypothesis, how ingenious soever, is now deservedly discarded, since the great discoveries made by sir Isaac Newton on the nature of light. The primary light they talk of, we now know, consists wholly in a certain motion of the particles of the lucid body, whereby they do not propel any fictitious matter, supposed to be lodged in the hidden pores of transparent bodies; but throw off from the luminous body certain very small particles, which are emitted every way with great force; and the secondary or derivative light consists not in a conatus, but a real motion of these particles, receding every way from the luminous body, in right lines, and that with an incredible velocity.

The most distinguishing property of light is that by which it renders objects visible by some power, which transfers their exterior figure to the retina of the eye.

We obtain light from three distinct sources, which will divide our subject into three heads; namely, solar light, light of combustion, and phosphorescent light.

Very little was known of the nature and properties of light before the experimental researches of Newton; and it is remarkable that at this time so little should have been added to the labours of that acute philosopher. It is strange, that after the evidence of his experiments there could have been two opinions respecting the nature of light. Huygens supposed the phenomena of light to be caused by an undulatory motion, excited in a supposed subtle and elastic medium, pervading all space: that these waves or pulses are propagated, first at the luminous body, such as the sun or a candle, and transmitted in all directions. The impression made by these waves upon the eye is the cause of vision. This doctrine has since been taken up by Euler, who, with much zeal and mathematical labour, supported it to his death. Newton, however, had given an hypothesis, supported by clear and striking experiments; and at the same time had pointed out insurmountable objections to the undulatory hypothesis, so that the labour and great talents of Euler were exhausted to little purpose.

Sir Isaac Newton argued, with great propriety, that the undulatory motion was inconsistent with the phenomena of Light. The passage of light would not be confined to straight lines, but might, like sound, be conveyed through crooked tubes, which is contrary to the fact.

Besides, if light consisted in a mere pressure, or pulse, it would be propagated to all distances in the same instant of time; the contrary of which appears from the phenomena of the eclipses of Jupiter's satellites, which we shall presently mention.

We shall therefore, with Newton, consider light as a material agent, moving with an immense velocity from the point where it is liberated. If its motion be in free space, it moves in straight lines in the form of radii, and would continue for ever in the same direction, if not changed in its course by the attraction of other matter. Light, therefore, like electricity and caloric, appears in a high degree to be repellant

repellent of itself, although it possesses attraction for ponderable matter. Indeed, it is to this great repulsion of the particles of light that we are to attribute its progressive velocity, which, therefore, is as the force by which its particles are separated.

The small extent of the limits of vision upon the surface of our globe does not enable us to appreciate the velocity with which light moves.

Roemer, a Danish philosopher, at length found the means of determining this point by the difference of time in the eclipses of Jupiter's satellites, when the earth was on the same, or on the contrary side of the sun, with that planet. The immersions of these satellites, as the earth approaches towards Jupiter, are found to anticipate somewhat on the true time, and to commence sooner; and again, as the earth retires from Jupiter, their immersions, which alone in that case can be observed, happen later and later, or lose time; deviating thus, very considerably on either side, from the true time marked by the tables.

This was first observed by M Roemer, and since by other astronomers; the reason of which is not owing to any eccentricity; but apparently follows from this circumstance, that the light of the sun, reflected from the satellites, has farther to travel, before it reaches the eye, in the one case than in the other, by a space equal to the diameter of the earth's annual orbit.

The observations, whence this conclusion was deduced, were made at the observatory belonging to the Royal Academy of Sciences at Paris, from 1670 to 1675; the principal fact was, that the first satellite sometimes emerged exactly at the times calculated by the tables, and sometimes not, inasmuch that the greatest variation was about fourteen minutes. The particular observation that was the most striking, was the emergence of this satellite observed at Paris, Nov. 9, 1676, ten minutes later than it had been observed in the month of August, when the earth was much nearer to Jupiter. Hence Cassini and Roemer both concluded, that this circumstance depended on the distance of Jupiter with respect to the earth; and that in order to account for it, they must suppose that the light was about fourteen minutes in crossing the earth's orbit.

But the conclusion was afterwards abandoned and attacked by Monsieur Cassini. M. Roemer's opinion found an able advocate in Dr. Halley; who removed Cassini's difficulty, and left M. Roemer's conclusion in its full force. In a memoir presented to the academy in 1707, Monsieur Maraldi endeavoured to give a new force to Cassini's arguments; but Monsieur Roemer's doctrine found a new defender in Mr. Pound. See Phil. Trans. N<sup>o</sup> 136. Phil. Trans. Abr. by Louth, vol. i. p. 409, 422. S'Grav. Phys. Elem. N<sup>o</sup> 2636, seq.

It has been since found, that when the earth is between the sun and Jupiter, his satellites are eclipsed about eight minutes sooner than they could be according to the tables, and that when the earth is nearly in the opposite point of its orbit, these eclipses happen about eight minutes later than the tables predict them. Hence it is undeniably certain, that the motion of light is not instantaneous, since it takes about  $16\frac{1}{2}$  (or  $16\ 10^{\frac{1}{2}}$ ) minutes, of time to go through a space equal to the diameter of the earth's orbit, which is at least 190 millions of miles in length; and consequently the particles of light fly about 191919 or 200000 miles every second of time, which is near a million of miles swifter than the motion of a cannon-ball. And as light is  $16\frac{1}{2}$  minutes in travelling across the earth's orbit, it must be  $8\frac{1}{4}$  (or  $8\ 5^{\frac{1}{2}}$ ) minutes in coming from the sun to us; therefore, if the sun were annihilated, we should see him for  $8\frac{1}{4}$  minutes after;

and if he were again created, he would be  $8\frac{1}{4}$  (or  $8\ 5^{\frac{1}{2}}$ ) minutes old before we could see him. In order to explain this progressive motion of light, let A and B, *Plate IX. Optics, fig. 1*, be the earth in two different parts of its orbit, whose distance from each other is 95 millions of miles, equal to the earth's distance from the sun S.

It is plain, that if the motion of light were instantaneous, the satellite I would appear to enter into Jupiter's shadow FF, at the same moment of time to a spectator in A, as to another in B. But it is now well known that the immersion of the satellite into the shadow is seen  $8\frac{1}{4}$  (or  $8\ 5^{\frac{1}{2}}$ ) minutes sooner when the earth is at B, than when it is at A. As the earth moves from D to C, through the side A B of its orbit, it is constantly meeting the light of Jupiter's satellites sooner, which occasions an apparent acceleration of their eclipses; and as it moves through the other half H of its orbit, from C to D, it is receding from their light, which occasions an apparent retardation of their eclipses, because their light is then longer before it overtakes the earth. That these accelerations and retardations are not occasioned by any inequality arising from the motions of the satellites in eccentric orbits is plain, because it affects them all alike, in whatever parts of their orbits they are eclipsed. Besides, they go often round their orbits every year, and their motions are no way commensurate to the earth's. Therefore a phenomenon not to be accounted for from the real motions of the satellites, but so easily deducible from the motion of the earth, and so unferable to it, must be allowed to result from it. And this affords one very good proof of the earth's annual motion. See the sequel of this article.

We shall here observe, that the first person, who conceived the thought of measuring the velocity of light was Galileo, who has given a particular description of his contrivance for this purpose, in his Treatise on Mechanics, p. 39. He had two men with lights, one of whom was to observe when the other uncovered his light, and to exhibit his own the moment that he perceived it: the experiment was tried, as may naturally be imagined, without success, at the distance of one mile; but the members of the academy Del Cimento resumed the experiment, and placed the observers, to as little purpose, at the distance of two miles. However, the method used by M. Roemer, already mentioned, was the only one adequate to the discovery of the velocity of light.

Our excellent astronomer, Dr. Bradley, has found nearly the same velocity of light, from his accurate observations, and most ingenious theory, to account for some apparent motions in the fixed stars. Phil. Trans. N<sup>o</sup> 406, or Abridg. vol. vi. p. 150. And for a summary account of these observations, &c. see EARTH and STAR.

To understand this, it must be premised, that the fixed stars are luminous bodies, and at rest, with respect to our planetary system, from which they are vastly remote. In this system also the earth is considered as one of the planets, and moving about the sun.

Suppose the sun represented in S, (*Plate IX. Optics, fig. 2*) and that the circle A B C D represents the path of the earth, or the ecliptic. At the centre S suppose a perpendicular SP raised to the plane of the ecliptic, and that this perpendicular passes through any fixed star. If a spectator were placed in S, he would see the star in the same perpendicular; but if the spectator passes over the circle A B C D, the diameter of which is supposed to bear a sensible though small proportion to the distance of the star, it will be perceived to change its situation in the heavens. For a spectator in A would see the star in the line A P a; in C he would see the same star in the line C P c; and

and so in any other point of his progress; whence it follows, that the star would seem to describe a circle in the heavens represented by  $abcd$ . If the distance of the star was fo very great, that in respect of it the diameter of the earth's orbit  $AC$  might be esteemed a point; in this case, the fore-  
said circle would be entirely insensible; and all the lines drawn from the points of the orbit to the star might pass for perpendiculars to the plane of the ecliptic, and in appearance would correspond to the same point in the heavens with the perpendicular in  $S$ , in which point the star would always appear, if its light could reach us in an instant. But if in this case, where the star is fo remote, the light is supposed to be propagated from the star with a certain velocity, at the same time that the earth proceeds in its orbit, the star will be seen in an oblique direction to the plane of the orbit; because of the motion compounded of the motion of light, and that of the spectator.

Suppose the light to move in the line  $EG$  (*fig. 3.*) making an angle with the line  $FG$ , in which the spectator is carried along; whom we shall conceive placed in  $F$ . Let the velocity of the spectator be to the velocity of the light, as  $FG$  to  $EG$ . While the spectator moves along  $FG$ , the light does the same along  $EG$ ; and the particle of light, which is in  $E$  when the spectator is in  $F$ , enters the eye only when he arrives at  $G$ . Now the direction of the light, with respect to the eye, makes with the line  $FG$  the angle  $EGF$ . For if we conceive the line  $FE$  drawn, and to be carried with a parallel motion along with the eye, so that in respect thereof it be at rest, while this continues moving, the light will reach the eye in the direction of the said line; for when the eye shall be in  $f$ , the middle point between  $F$  and  $G$ , the transferred line, will cut  $EG$  in its middle point  $g$ , to which the particle of light has reached, and which is likewise the middle point of the transferred line  $fe$ ; wherefore the particle of light, which was in  $E$ , in the extremity of the line  $E F$ , arrives at, and will enter the eye in the direction  $eg$ .

Let the angle  $E G F$  (*fig. 4.*) be a right one, and  $EG$  to  $FG$  as the velocity of the light to the velocity of the earth in its orbit; then  $EFG$  will be the angle, which the ray of light entering the eye, makes with the plane in which the earth moves round the sun.

If the earth be in  $B$  (*fig. 5.*) it moves in the direction of the tangent to its orbit in this point; that is, if we suppose the spectator in the sun, the direction of the earth's motion is parallel to  $SC$ ; and making the angle  $aSC$  equal to the angle  $EGF$  in the former figure, the line  $Sa$  will represent the line in which the spectator would see the star.

In the same manner when the earth is in  $D$ , the spectator in the sun will see the star in  $S_c$ , the angles  $PS_c$  and  $PS_a$  being equal; and the line  $Sa$  or  $S_c$ , by its revolution about  $PS$ , would describe a cone, whose base in the heavens would be a circle representing the apparent path of the star through a whole year. Let us suppose this circle to be  $abcd$ , as in *fig. 5.*

When the star is not in the perpendicular to the plane of the ecliptic, but the line  $PS$  (*fig. 6.*) is inclined to that plane, the lines which determine the apparent motion of the star in the heavens will form cones, as in the cases already explained; only they would be oblique, and in both cases the apparent path of the star in the heavens would be determined as above: but in this last case it would be an ellipsis, the greater diameter of which would be equal to the diameter of the circle  $abcd$  of the former figures; so that knowing this ellipsis, the circle might easily be found which

the star would describe, if placed in the perpendicular to the plane of the ecliptic.

The only way to determine, whether the stars describe such ellipsis, is by observations; in making which there are great difficulties, which, however, Dr. Bradley has with incomparable industry surmounted.

Nothing can immediately be determined concerning the fore-  
said elliptic motion. The distance of the star from the pole of the world must be measured at different times of the year, and from the different distances the elliptic motion is to be determined by calculation, allowing for the motion of the pole itself during the space of time between the observations; for the pole moves in a lesser circle, one degree of which it passes over in feventy-two years.

Dr. Bradley, making all necessary allowances, observed several stars at different times of the year, whereby he immediately discovered, that their distances from the pole of the world varied; and was convinced that this variation could not be attributed to the nutation of the pole; for he examined two stars at equal distances from the pole, but fo opposite, that the one ought to have receded from the pole as much as the other acceded to it, if the motion was in the pole itself. But this did not fall out fo; for the change of the one star was double of that of the other; a proper allowance being always made for the pole's motion arising from the above revolution. However, this indefatigable observer inferred from his observations, that the stars in certain times receded from, and acceded to, the pole of the world with a motion entirely analogous to that which is performed in an ellipsis; and also that they move in such curves, for each of which the motion in the same little circle, as  $abcd$  (*fig. 6.*) answers, when the stars are referred to the perpendicular in  $S$  to the plane of the ecliptic; and the diameter of this minute circle for them all is  $40\frac{1}{2}$ .

It is plain from observations, to which of the above mentioned causes we are to ascribe the motion of the star. For if the first takes place, the star would be carried from  $a$  to  $c$ , while the earth passed over the part  $ABC$  of its orbit; but this, being contrary to observation, cannot be the true cause. But this change in the situation of the star takes place according to the observations, while the earth describes the part  $BCD$  of its orbit, which is just what the second cause requires.

If both the causes took place at the same time, the arc described by the earth would differ from that indicated by either of them; besides, this concurrence of the causes is contrary to the observations; unless, perhaps, it may be thought reasonable to attribute a little influence to the first cause; but fo very small a portion, as not to be sensibly perceived in the observations.

Dr. Bradley himself considered this matter in the following manner: he imagined  $CA$  (*Plate IX. Optics, fig. 7.*) to be a ray of light falling perpendicularly upon the line  $BD$ ; that, if the eye is at rest at  $A$ , the object must appear in the direction  $AC$ , whether light be propagated in time or in an instant. But if the eye is moving from  $B$  towards  $A$ , and light is propagated in time, with a velocity that is to the velocity of the eye as  $CA$  to  $BA$ , then light, moving from  $C$  to  $A$ , whilst the eye moves from  $B$  to  $A$ , that particle of it by which the object will be discerned when the eye comes to  $A$ , is at  $C$ , when the eye is at  $B$ . Joining the points  $B, C$ , he supposed the line  $CB$  to be a tube, inclined to the line  $BD$  in the angle  $DBC$ , of such a diameter as to admit but one particle of light. Then it was easy to conceive, that the particle of light at  $C$ , by which the object must be seen, when the eye, as it moves along, arrives at  $A$ , would pass through the tube  $BC$ , if

it is inclined to BD in the angle DBC, and accompanies the eye in its motion from B to A; and that it could not come to the eye placed behind such a tube, if it had any other inclination to the line BD. If, instead of supposing CB so small a tube, we imagine it to be the axis of a larger; then, for the same reason, the particle of light at C would not pass through that axis, unless it is inclined to BD in the angle CBD. In like manner, if the eye move the contrary way, from D towards A, with the same velocity, then the tube must be inclined in the angle BDC. Although, therefore, the true or real place of an object is perpendicular to the line in which the eye is moving, yet the visible place will not be so, since that, no doubt, must be in the direction of the tube; but the difference between the true and apparent place will be, *ceteris paribus*, greater or less, according to the different proportion between the velocity of light and that of the eye. So that if we could suppose that light was propagated in an instant, then there would be no difference between the real and visible place of an object, although the eye were in motion; for in that case, AC being infinite with respect to AB, the angle ACB, the difference between the real and visible place, vanishes. But if light be propagated in time, it is evident, from the foregoing considerations, that there will be always a difference between the true and visible place of an object, unless the eye is moving either directly towards or from the object. And in all cases the sine of the difference between the real and visible place of the object will be to the sine of the visible inclination of the object to the line in which the eye is moving, as the velocity of the eye is to the velocity of light.

He then shews that if the earth revolve round the sun annually, and the velocity of light be to the velocity of the earth's motion in its orbit, as one thousand to one, that a star really placed in the very pole of the ecliptic, would, to an eye carried along with the earth, seem to change its place continually; and neglecting the small difference on the account of the earth's diurnal revolution on its axis, would seem to describe a circle round that pole every way distant from it  $3\frac{1}{2}$ ; so that its longitude would be varied through all the points of the ecliptic every year, but its latitude would always remain the same. Its right ascension would also change, and its declination, according to the different situation of the sun with respect to the equinoctial points, and its apparent distance from the north pole of the equator, would be  $7'$  less at the autumnal than at the vernal equinox.

The greatest alteration of the place of a star in the pole of the ecliptic, or which, in effect, amounts to the same thing, the proportion between the velocity of the light and the earth's motion in its orbit being known, it will not be difficult, he observes, to find what would be the difference, upon this account, between the true and apparent place of any other star at any time; and, on the contrary, the difference between the true and apparent place being given, the proportion between the velocity of light and the earth's motion in its orbit may be found.

From all which the following conclusions may be deduced: 1. That the second cause above-mentioned alone takes place in this case, *viz.* that the distance of the stars is so great, that the diameter of the earth's orbit has no sensible proportion to it. 2. That the angle FEG (*fig. 3.*) in the above mentioned triangle, is  $20\frac{1}{4}$ ; or, since the apparent declination of the star  $\gamma$  Draconis, observed by Dr. Bradley, on account of the successive propagation of light, would be to the diameter of the little circle which a star would seem to describe about the pole of the ecliptic as  $39''$  to  $40''$ .4; the

half of this is the angle ACB (*fig. 7.*) which is equal to  $20''$ .2; and consequently the ratio of EG to FG (*fig. 3.*) or of AC to AB (*fig. 7.*) or the velocity of the light to the velocity of the earth in its orbit, as 10210 to 1; whence it follows, that the light comes from the sun to the earth in  $8'12''$ . This, Dr. Bradley observes, is very probably the truth, because it is a medium between 7 and 11, which were the times which it had before been supposed to take up, according to different observations of the eclipses of Jupiter's satellites. Comparing his observations on other stars, he afterwards concluded, that light is propagated from the sun to the earth in  $8'13''$ ; and the near agreement of his observations induced him to think, that this supposition could not differ so much as a second of a degree from the truth; so that the time which light spends in passing from the sun to us may be determined by these observations within  $5''$  or  $10''$ , which is such a degree of exactness as we can never hope to attain from the eclipses of Jupiter's satellites. 3. That the light proceeds with the same velocity from all the stars; for all have the same angle FEG. Whence (if we suppose that all the stars are not equally distant from us, as many arguments prove) it will follow, that the motion of light, all the way it passes through the immense space above our atmosphere, is equal or uniform. And since the different methods of determining the velocity of light thus agree in the result, it is reasonable to conclude, not only that the phenomena above recited are owing to the causes to which they are ascribed, but also that, in the same medium, light is propagated with the same velocity after it has been reflected, as before. 4. Lastly, it must be considered, that very small differences cannot be perceived; and nobody will deny, but that in measuring a small angle, an error of a second may be committed, whatever care is used to prevent it; and therefore, although we have said, that the first cause is to be rejected, we do not deny that the stars may possibly by its influence describe a minute circle, whose diameter is  $1''$ , or even a little more. S'Gravandane's *Phys. Elem. Math. lib. ii. cap. 1. p. 708, seq.*

Hence it appears, that the successive propagation of light will cause an aberration in the appearances of the stars, planets, and comets. (See *ABERRATION.*) After Dr. Bradley had discovered this cause of error in the apparent places of the fixed stars, M. Clairaut and others investigated several rules for the computation of this aberration. M. Euler also has given us a paper on this subject. *Mem. Acad. Scienc. 1756.* Mr. Simpson, in his *Essays. Mem. de l'Acad. de Berlin, tom. ii. p. 141, seq.*

See remarks on the effect of the aberration of light on the time of the transit of Venus over the sun, by Dr. Price, in *Phil. Trans. vol. lx. art. 47. p. 536.*

For an account of Mr. Melville's hypothesis of the different velocities of differently coloured rays, see *REFRACTIBILITY.*

Whether the light emitted by candles and other luminous bodies acquires the same velocity it is difficult to determine. So far as our knowledge extends on that head, it does not appear inferior to solar light.

But to return to the hypothesis of pressure, by which some have accounted for the propagation of light, it might be observed farther, if light were not a body, but consisted in a mere pressure, or pulsion, it would never be propagated in right lines, but would be continually inflected ad umbra. Thus sir Isaac Newton: "A pressure on a fluid medium, *i. e.* a motion propagated by such a medium, beyond any obstacles, which impedes any part of its motion, cannot be propagated in right lines, but will be always inflecting and diffusing

diffusing itself every way, to the quiescent medium beyond that obstacle. The power of gravity tends downwards; but the pressure of water arising from it tends every way with an equable force, and is propagated with equal ease, and equal strength, in curves, as in straight lines. Waves, on the surface of the water, gliding by the extremes of any very large obstacle, inſect and dilate themselves, ſtill diffuſing, gradually, into the quiescent water beyond that obstacle. The waves, pulses, or vibrations of the air, wherein ſound conſiſts, are manifeſtly inſected, though not ſo conſiderably as the waves of water; and ſounds are propagated with equal eaſe, through crooked tubes, and through ſtraight lines: but light was never known to move in any curve, nor to inſect itſelf ad umbram." The rays of light, therefore, are ſmall corpuscles, emitted with exceeding celerity from the luminous body. As to the force wherewith theſe corpuscles are emitted, ſo as to enable them to move at the inconceivable rate of 200,000 miles a ſecond; the ſame great author obſerves; "Among bodies of the ſame kind and virtue, by how much any one is ſmaller, by ſo much is its attractive power greater in proportion to its bulk. This power we find ſtronger in ſmall magnets, than in large ones, regard being had to the difference of their weights: and the reaſon is, that the particles of ſmall magnets being nearer each other, more eaſily unite their forces intimately together, and act conjointly. For the ſame reaſon the rays of light, being of all other bodies the moſt minute, it may be expected that their attractive powers ſhould be, of all others, the ſtrongest; and how ſtrong in effect they are, may be gathered from the following rules: the attraction of a ray of light, according to the quantity of its matter, is to the gravity which any projected body has, according, likewise, to the quantity of its matter, in a ratio compounded of the velocity of the ray of light, to the velocity of that projected body, and of the bending or curvature of the line which the ray deſcribes in the place of refraction, to the bending of the curvature deſcribed by that projected body; provided, however, the inclination of the ray to the refracting ſurface be the ſame with that of the projected body to the horizon. From which proportion I gather, that the attraction of the rays of light is above 1,000,000,000,000,000 times greater than the gravity of bodies on the ſurface of the earth, in proportion to the quantity of matter in each, if the light paſs from the ſun to the earth in the ſpace of ſeven minutes. But now, as in algebra, where affirmative quantities ceaſe, there negative ones begin; ſo in mechanics, where attraction ceaſes, there the repelling power muſt ſucceed: therefore a ray of light, as ſoon as it is caſt off from the luminous body, by the vibrating motion of its parts, and is got out of the ſphere of its attraction, is propelled with an immenſe velocity."

The wonderful diviſibility of the parts of matter is nowhere more apparent than in the minuteness of the particles of light. Dr. Nieuwentyſ has computed, that an inch of candle, when converted to light, becomes divided into 269,617,040 parts, with 40 ciphers annexed; at which rate there muſt iſſue out of it, when burning, 418,660, with 39 ciphers more, particles in the ſecond of a minute; vaſtly more than a thouſand times a thouſand million times the number of ſands the whole earth can contain; reckoning ten inches to one foot, and that 100 ſands are equal to one inch. See Reliq. Philoſ. vol. iii. p. 865.

It muſt be acknowledged, that many difficulties and objections have been urged againſt the materiality of light, or the hypotheſis of light's conſiſting of ſmall particles emitted from luminous bodies; and that many eminent philoſophers, both foreigners and Engliſh, have recurred to the opinion, that

light conſiſts of vibrations propagated from the luminous body through a ſubtile ethereal medium.

The ingenious Dr. Franklin, in a letter dated April 23d, 1752, expreſſes his diſſatisfaction with the doctrine, that ſuppoſes particles of matter, called light, continually driven off from the ſun's ſurface, with a ſwiftness fo prodigious. "Muſt not," ſays he, "the ſmalleſt portion conceivable have, with ſuch a motion, a force exceeding that of a twenty-four pounder diſcharged from a cannon? Muſt not the ſun diminiſh exceedingly by ſuch a waſte of matter; and the planets, inſtead of drawing nearer to him, as ſome have feared, recede to greater diſtances through the leſened attraction? Yet theſe particles, with this amazing motion, will not drive before them, or remove, the leaſt and lighteſt duſt they meet with; and the ſun appears to continue of his ancient dimenſions, and his attendants more in their ancient orbits." Accordingly, he conjectures, that all the phenomena of light may be more conveniently ſolved, by ſuppoſing univerſal ſpace filled with a ſubtile elaſtic fluid; which, when at reſt, is not viſible, but whoſe vibrations affect that fine ſenſe in the eye, as thoſe of air do the groſſer organs of the ear: and that different degrees of the vibration of this medium may occasion the appearances of different colours. The elaſtic fluid, he ſays, is always the ſame, and yet weaker and ſtronger ſparks diſfer in apparent colour, ſome white, blue, purple, red; the ſtrongeſt, white; the weak ones, red. Franklin's Exp. and Obſ. &c. p. 264, &c. ed. 1769.

The celebrated Mr. Euler (as we have already obſerved), has alſo ſtrenuouſly maintained the ſame hypotheſis, in his Theoria Lucis & Colorum. In the ſummary of his arguments againſt the common opinion, recited in Acad. Berl. 1752. p. 271, beſides the objections above-mentioned, he diſputes the poſſibility, that particles of matter, allowed to move with the amazing velocity of light, ſhould penetrate tranſparent ſubſtances with ſo much eaſe. In whatever manner they are tranſmitted, thoſe bodies muſt have pores, diſpoſed in right lines, and in all poſſible directions, in order to form canals for the paſſage of the rays: but ſuch a ſtructure muſt take away all ſolid matter from thoſe bodies, and all coherence among their parts, if they do contain any ſolid matter.

Dr. Horſley has taken conſiderable pains to obviate the difficulties ſuggeſted by Dr. Franklin; and ſuppoſing that the diameter of each particle of light does not exceed one millionth of one millionth of an inch, and that the density of each particle is three times that of iron, that the light of the ſun travels the ſemi-diameter of the orbis magnus in 7', and that this ſemi-diameter is 22919 ſemi-diameters of the earth, he calculates, that the momentum or force of motion in each particle of light coming from the ſun, is leſs than that in an iron ball of 4th of an inch diameter, moving at the rate of leſs than an inch in twelve thouſand millions of millions of Egyptian years. Hence, he concludes, that a particle of matter, which is probably larger than any particle of light, moving with the velocity of light, has a force of motion, which, inſtead of exceeding the force of a twenty-four pounder diſcharged from a cannon, is infinitely leſs than that of the ſmalleſt ſhot diſcharged from a pocket-piſtol, or leſs than any that art can create. Moreover, he thinks it poſſible, that light may be produced by a continual emission of matter from the ſun, without any ſuch waſte of his ſubſtance as ſhould ſenſibly contract his dimenſions, or alter the motions of the planets, within any moderate length of time. In proof of this, he obſerves, that it is not neceſſary to the production of any of the phenomena of light, that the emanation from the ſun ſhould be continual in a ſtrict mathematical ſenſe, or without any interval; and likewise that

part of the light which issues from the sun is continually returning to him by reflection from the planets, and other light is continually coming to him from the suns of other systems. He proceeds by calculation to shew, that in 385,130,000 Egyptian years, the sun would lose  $\frac{1}{1723}$  of his matter, and, therefore, that the gravitation towards the sun, at any given distance, would diminish in the same proportion. But this alteration is much too small to discover itself in the motion of the earth, or of any of the planets. He also computes, that the greatest stroke which the retina of a common eye sustains, when the eye, in a bright day, is turned up directly to the sun, does not exceed that which an iron shot,  $\frac{1}{4}$ th of an inch diameter, would give, moving only at the rate of 16.16 inches in a year; but the ordinary stroke is less than the  $\frac{1}{1723}$ th part of this. (Phil. Transf. vol. lx. art. 35. vol. lxi. part ii. art. 50.) One of the principal difficulties attending the hypothesis of the materiality of light, is the non-interference of its particles with each other. There is, probably, says Mr. Melville, Edinb. Ess. vol. ii. p. 17, &c. no physical point in the visible horizon, that does not send rays to every other point, unless where opaque bodies interpose. Light, in its passage from one system to another, often passes through torrents of light issuing from other suns and systems, without ever interfering, or being diverted from its course either by it, or by the particles of that elastic medium, which some have supposed to be diffused through all the mundane space. In accounting for this fact, he supposes that the particles of light must be incomparably rare, even when they are the most dense; that is, that the semidiameters of two of the nearest particles, in the same, or in different beams, soon after their emission, are incomparably less than their distance from one another. This consideration obviates the objection urged by Euler and others against the materiality of light, from its influence in disturbing the freedom and perpetuity of the celestial motions. Boscovich and others solve the difficulty concerning the non-interference of the particles of light, by supposing that each particle is endued with an insuperable impulsive force; but in this case, their spheres of impulsion would be more liable to interfere, and they would, on that account, be more likely to disturb one another. This difficulty, attending the supposition, that particles of light move through other light, in all imaginable directions, without perpetual collisions among the particles, and continual deflections from a rectilinear course, is, in a great degree, obviated, by an easy computation of Mr. Canton. He observes, that it is necessary to allow only a very small portion of time between the emission of every particle, and the next that follows in the same direction. Suppose, for instance, that one lucid point of the sun's surface emits 150 particles in one second, which are more than sufficient to give continual light to the eye, without the least appearance of intermission; yet still the particles of which it consists will, on account of their great velocity, be more than a thousand miles behind one another, and thereby leave room enough for others to pass in all directions. Phil. Transf. vol. lviii. art. 45. p. 344.

If we adopt the conclusions drawn from the chevalier d'Arcy's experiments on the duration of the sensations excited by light, who states it at the seventh part of a second (Hist. Acad. Scienc. 1765, Mem. 2.) we may admit an interval of more than 20,000 miles between each particle. Some, in order to answer the chief objections of this kind against the materiality of light, have adopted the hypothesis of M. Boscovich; who advances, in his Theoria Philosophicæ Naturalis, that matter is not impenetrable, but that it consists of physical points only, endued with

powers of attraction and repulsion, taking place at different distances; that is, surrounded with various spheres of attraction and repulsion, in the same manner as solid matter is generally supposed to be; provided, therefore, that any body move with a sufficient degree of velocity, or have sufficient momentum, to overcome any powers of repulsion it may meet with, it will find no difficulty in making its way through any body whatever; for nothing will interfere or penetrate one another, but powers, such as we know, do, in fact, exist in the same place, and counterbalance or overrule one another. Priestley's Hist. &c. of Light, &c. p. 391. That light is a real substance, notwithstanding the objections that have been urged against this hypothesis, seems to be established by the phenomena of the Bolognian stone, and of other substances, which possess the remarkable property of imbibing light, of retaining it for some time, and afterwards of emitting it. See PHOSPHORUS, and the sequel of this article.

The doctrine of the materiality of light is farther confirmed by those experiments, which demonstrate, that the colour and inward texture of some bodies are changed, in consequence of their being exposed to the light.

The first observation of this kind appears to have been made by M. Duhamel, who found that the juice of a certain shell-fish in Provence contracted a fine purple colour when it was exposed to the light of the sun, and that the stronger was the light, the more splendid was the colour. Pieces of cloth dipped in this liquor, and exposed to the sun, became red, though they were inclosed in glass; but they acquired none of this colour in the same exposure, if they were covered with the thinnest plates of metal. It was afterwards observed by Beccarius, Com. Bonon. vol. iv. p. 75, that a quantity of luna cornea, exposed to the rays of the sun, became of a violet colour, whilst part of the same composition, covered with black paper, remained white. This effect was found by M. H. Schulze to depend on the silver that happened to be in it. (Ac. Cæsar. vol. i. p. 528, &c.) G. Bonzius was thus led to some subsequent experiments, which seem to prove that various colours are considerably affected by light, exclusive of heat or any thing else. By exposing ribbons of different colours to the rays of the sun for several days in the open air, he found that all, except the yellow and light green, lost part of their lustre, and were considerably faded; but when the same ribbons were exposed to a much greater degree of heat in a dark room, none of the colours were affected, except that a small part of their lustre was lost; nor was any sensible change made in them after remaining for a considerable time in a room that faced the north. By inclosing them in an exhausted receiver, he found that the change was not occasioned by the air; but no change could be produced in them by the light of torches. Beccarius also found by experiments on paper, and a great variety of substances, mineral, vegetable, and animal, that the light of the sun produced many changes in the internal structure of bodies, and that those substances which imbibed light were much injured. The stronger the light, and the longer they were exposed to it, the more injury they received; and the injury thus sustained was found to be lasting. Com. Bon. vol. vi. p. 77, &c. See Priestley's History, p. 378, &c.

Some writers have attempted to prove the materiality of light, by determining the momentum of their component particles, or by shewing that they had a force, so as, by their impulse, to give motion to light bodies. M. Homberg, Ac. Par. 1708. H. p. 25, imagined, that he could not only disperse pieces of amianthus, and other light substances, by the impulse of the solar rays, but also that by throwing them

them upon the end of a kind of lever, connected with the spring of a watch, he could make it move sensibly quicker; whence, and from other experiments, was inferred the weight of the particles of light. But M. Du Fay, and M. Mairan, made other experiments of a more accurate kind, which exhibited no such effects as M. Hombert imagined. However, Dr. Priestley informs us, that Mr. Mitchell endeavoured to ascertain the momentum of light with still greater accuracy, and that his endeavours were not altogether unsuccessful. Having found that the instrument which he used acquired, from the impulse of the rays of light, a velocity of one inch in a second, he inferred, that the quantity of matter contained in the rays falling upon the instrument at that time, amounted to no more than one twelve hundred millionth part of a grain. In the experiment, the light was collected from a surface of about three square feet; and as this surface reflected only about half what falls upon it, the quantity of matter contained in the rays of the sun, incident upon a square foot and half of surface in one second of time, ought to be no more than the twelve hundred millionth part of a grain, or upon one square foot only, the eighteen hundred millionth part of a grain. But the density of the rays of light at the surface of the sun is greater than at the earth, in the proportion of 45000 to 1; there ought, therefore, to issue from one square foot of the sun's surface in one second of time, in order to supply the waste by light, one forty thousandth part of a grain of matter; that is, a little more than two grains a day, or about four millions seven hundred and fifty-two thousand grains, which is about six hundred and seventy pounds, *avoirdupois*, in six thousand years; a quantity which would have shortened the sun's semi-diameter no more than about ten feet, if it was formed of matter of the density of water only. Priestley, *ubi supra*, p. 389.

The nature of light has not been satisfactorily ascertained by any of the experiments and investigations of philosophers. Some incline to the Newtonian hypothesis, which ascribed it to the emission of very minute particles from luminous substances, as we have already stated; and others to the excitation of an undulatory motion, analogous to that which constitutes sound, in a very rare and elastic medium, which pervades the universe. There are also some circumstances which induce those who entertain the first hypothesis, either to believe, with Newton, that the emanation of the particles of light is always attended by the undulations of an ethereal medium, accompanying it in its passage, or to suppose, with Boscovich, that the minute particles of light themselves receive, at the time of their emission, certain rotatory and vibratory motions, which they retain as long as their projectile motion continues. These additional suppositions, however necessary they may have been thought for explaining some particular phenomena, have never been very generally understood or admitted, although no attempt has been made to accommodate the theory in any other manner in these phenomena. Dr. Young, in his "Course of Lectures on Natural Philosophy, &c." has examined in detail the manner in which the two principal hypotheses respecting light may be applied to its various affections and properties; for which we refer to vol. i. p. 453, &c. to the sequel of this article, and to other appropriate terms that occur in the Cyclopaedia.

The expansion or extension of any portion of light is inconceivable. Dr. Hook shows it is as unlimited as the universe; proving it from the immense distance of some of the fixed stars, the light whereof becomes sensible to the eye by means of a telescope: nor, adds he, are they only the great bodies of the sun or stars that are thus

liable to disperse their light through the vast expanse of the universe, but the smallest spark of a lucid body must do the same, even the smallest globule struck from a steel by a flint.

The method of measuring the intensity of different lights, or of the same light in different circumstances, affords a curious subject of investigation. M. Bouguer pursued it with particular attention, and described an apparatus which he has contrived for this purpose, in his *Traité de Optique*, published in Paris, 1760. Dr. Priestley (*ubi infra*) has given an abridged account of the two methods used for this purpose by M. Bouguer. The first of these two methods has been used by others since, and probably before that time, and particularly by count Rumford. See PHOTOMETER.

It is well known that the action of a strong light upon the eye, and also the impression which it leaves upon the eye, makes it insensible to the effect of a weaker light. M. Bouguer found, that when one light is sixty-four times less than another, its presence or absence will not be perceived; and, allowing for different effects on different eyes, he supposes that the boundaries, with respect to different persons, may lie between sixty and eighty. Being unable to determine the variation of the light of the sun, because it is too strong, and that of the stars, because it is too weak, at different altitudes, he made his observations on the moon, the diminution of the light being in the same proportion in this case and in the others, and found that its light at  $19^{\circ} 16'$  is to its light at  $66^{\circ} 11'$ , as 1681 to 2500; or the one is nearly two-thirds of the other. When one limb of the moon touched the horizon of the sea, its light was two thousand times less than at the altitude of  $66^{\circ} 11'$ . But this proportion, he says, is liable to variations, the atmosphere near the surface of the earth varying so much in its density. Hence he concludes, that, at a medium, light is diminished in the proportion of about 2500 to 1681, in traversing 7469 toises of dense air. He also found, that the centre of the sun is considerably more luminous than the extremities of it; whereas, both the primary and secondary planets are more luminous at their edges than near their centres. In a comparison of the light of the sun and moon, he compared each of them to that of a candle in a dark room, one in the day time, and the other in the night following, when the moon was at her mean distance from the earth, and, after many trials, he concluded, that the light of the sun is about three hundred thousand times greater than that of the moon; and, therefore, it is no wonder that philosophers have had so little success in their attempts to collect the light of the moon with burning-glasses; for the largest of them will not increase the light a thousand times, which will still leave the light of the moon, in the focus of the mirror, three hundred times less than the intensity of the common light of the sun. Dr. Smith, in his *Optics*, vol. i. p. 29, thought that he had proved, from two different considerations, that the light of the full moon would be to our day-light as 1 to about 90000, if no rays were lost at the moon. His method of calculation follows, as far as it is just, says Mr. Robins, *Math. Tracts*, vol. ii. p. 225, directly from the proposition for the same purpose of that excellent geometer, James Gregory, in his *Geom. Par. Univers.* p. 144; and the general proposition there mentioned for diluting the proportion between the degrees of light received from any planet, and from the sun, as repeated in David Gregory's *Astronomy*, lib. iii. prop. 58. Mr. Robins remarks, that though his estimate is founded on the supposition, that the moon reflects all the light it receives from the sun; yet his argument is drawn from compar-

paring the light of the moon seen in the day with the light of the clouds; that is, is deduced from the quantity of light actually reflected by the moon. In the first place he supposes that the moon, enlightened by the sun, is as luminous as the clouds are at a medium. He, therefore, supposed the light of the sun to be equal to that of a whole hemisphere of clouds, or as many moons as would cover the surface of the heavens. But upon this it may be observed, that the light of the sun shining perpendicularly upon any surface, would be equal to the light reflected from the whole hemisphere, if every part of it reflected all the light that fell upon it; but the light that would, in fact, be received from the whole hemisphere (part of it being received obliquely) would be only one-half as much as would be received from the whole hemisphere. if every part of it shone directly upon the surface to be illuminated. In his Remarks, &c. p. 17, he draws the same conclusion from a different method of induction; but in this case also he made a mistake of one-half, supposing all the enlightened hemisphere of the moon to receive the direct rays of the sun; whereas, in fact, no more can be received than would fall perpendicularly on the superficial section of one great circle, which is just one-half of the surface of the hemisphere. Priestley, ubi supra, p. 540, &c.

Mr. Mitchell made this computation in a more easy and accurate manner. Considering the distance of the moon from the sun, and that the density of the light must decrease in the proportion of the square of that distance, he calculated the density of the sun's light at that distance, in proportion to its density at the surface of the sun: and in this manner he found that, if the moon reflected all the light it receives from the sun, it would be only the 45000th part of the light we receive from that greater luminary. Admitting, therefore, with M. Bouguer, that the moon reflects only a 300.000th part of it, Mr. Mitchell concludes, that it reflects no more than between the sixth and seventh part of the light that falls upon it. Phil. Trans. vol. lvii. art. 27, P. 234, &c.

Dr. Pemberton, in his Course of Chemistry, lect. 2. states the greatest light which we can receive from the moon, when at the full, and nearest to the earth, to exceed the light of the sun more than 87,000 times, supposing that the moon reflected all the light of the sun which falls upon it; but if it reflects only half the light that falls upon its surface, which is the most that can be supposed, then the light of the moon will be exceeded by the sun's light more than 170,000 times: and in the mean distance of the moon from the earth, her light will be exceeded by the sun more than 190,000 times.

The mutual action between light and other matter is productive of numerous phenomena. These of late have constituted two distinct branches of science. The one has for its object the investigation of the physical properties of light, for which we are principally indebted to Newton, and which forms the basis of the science of optics. The other is confined to the chemical agency of light, resting upon facts discovered since the time of that great genius, and which has hitherto occupied the attention of the chemical philosopher.

When a ray of light falls upon the surface of a body, it is either reflected, absorbed, and extinguished, or transmitted. And under some circumstances all these effects take place.

The reflection of the ray depends, first, upon the nature of the body; secondly, upon the state and colour of the surface; and, thirdly, upon the quantity of the angle of incidence. Under all these circumstances, however, the angle

at which the ray is reflected is equal to the angle of incidence. The same laws, therefore, which govern the collision between perfectly elastic bodies and absolutely hard surfaces, may be applied to the reflection of light. Of the different bodies which reflect light, metals possess this power in the greatest degree, and perhaps in proportion to their density and hardness. Smooth or polished surfaces reflect more light than rough ones.

Of coloured surfaces the lightest colours reflect the most; hence the whitest metals make the best reflectors. The order will therefore, in all probability, be as follows, beginning with the best reflectors, white, yellow, red, blue, black. The two extremes are very striking, in the well-known experiment of two pieces of cloth, one white and the other black, laid on the surface of snow in the sun. The black piece very soon sinks into the snow, from absorbing a greater quantity of light, which causes the heat. The white piece reflects a greater portion, and is longer in becoming heated. With regard to the quantity of reflection, as affected by the angle of the incidence; it is found that opaque bodies are more heated as the rays strike their surfaces more perpendicularly, and the quantity of light which enters transparent bodies is as the same. In both instances, therefore, more light enters the bodies, and less is reflected. In the first instance, the light which is not reflected becomes extinguished, producing heat; in the second it is transmitted, still retaining the property of light. Hence, therefore, we ought to conclude that the reflection will be inversely as the angle of incidence, supposing the angle to be formed by the ray and the surface of the medium.

M. Bouguer has informed us, that the light reflected from a surface of mercury, when the angle of incidence was  $11\frac{1}{2}^\circ$ , was only equal to  $\frac{1}{4}$ th of the whole; and he thinks it probable that no substance reflects more. It is certain, however, that polished silver reflects much more. The same philosopher observes, that metallic reflectors change less in their power of reflection with the angle of incidence. He made the following experiment with polished black marble. At an angle of  $3^\circ 35'$  with the reflecting surface, .6 were reflected, the whole being unity; at  $15^\circ$  of incidence, .156 were reflected; at  $30^\circ$ , .051; and at  $80^\circ$ , .023. The rest of course became extinguished, and would heat the marble.

A similar diminution of the reflective power, with the angle of incidence, is observed in transparent bodies, by the same author. The following Table gives the results with water and plate-glass.

Angle of Incidence.	The Quantity of Light reflected, the whole being 1000.	
	From Water.	From Plate-Glass.
$\frac{1}{2}^\circ$	721	
1	692	
$1\frac{1}{2}$	669	
2	639	
$2\frac{1}{2}$	614	584
5	501	543

## L I G H T.

Angle of Incidence.	The Quantity of Light reflected, the whole being 1000.	
	From Water.	From Plate-Glass.
$7^{\circ}\frac{1}{2}$	409	474
10	333	412
$12^{\circ}\frac{1}{2}$	271	356
15	211	299
$17^{\circ}\frac{1}{2}$	178	
20	145	222
25	97	157
30	65	112
40	34	57
50	22	34
60	19	27
70	18	25
80	18	25
90	18	25

The reflections in this instance are partly made from the upper, and the rest from the under surface. The remainder of the thousand parts are transmitted, with the exception of a few, which are in all probability extinguished.

That, under certain circumstances, the rays of light are extinguished, even in transparent bodies, is rendered highly probable by the above inquirer.

Light becomes so far extinct, by passing through 679 feet of sea-water, as to render it opaque; and a length of seven feet of water has been found to intercept one-half of the light which enters it.

M. Bouguer tells us, that if our atmosphere were 518,385 toises in height, we should have no light from the sun, even in his meridian splendour. It has been estimated, that of the horizontal sun-beams passing through about 200 miles of air, one two-thousandth part only reaches us.

In all the instances in which light is extinguished, it will doubtless be so found that a certain quantity of heat will be generated. Sir Isaac Newton seems perfectly aware of this fact. In his time, however, heat was supposed to arise from motion, and hence he concluded that the light, when it was neither reflected nor transmitted, so acted upon the body it entered, as to put its particles into a vibratory motion, in which he believed the heat to consist.

Dr. s'Gravesande asserts, a lucid body to be, that which emits, or gives fire a motion in right lines; and makes the difference between light and heat to consist in this, that to produce the former, the fiery particles must enter the eye in a rectilinear motion, which is not required in the latter; on the contrary, an irregular motion seems more proper for it, as appears from the rays coming directly from the sun to

the tops of mountains, which have not near that effect with those in the valley, agitated with an irregular motion, by several reflections.

Whether or not there be always light, where there is fire, has been disputed among authors; as also, whether or not there be any luminous body without heat; heat being considered by them as a motion that may be infinitely diminished, and light a matter that may be infinitely rare; to which we may add, that no heat is sensible to us, unless it be more intense than that of our organs of sense. M. De Luc, in his *Lettres Physiques et Morales*, &c. 1780, observes, that the rays of the sun, though not warm in themselves, occasion heat, by giving activity to a substance, which resides in all bodies, and constitutes a part of their mass, and which in certain circumstances is capable of producing heat: and that in consequence of this influence, this substance becomes an elastic or igneous fluid. (See HEAT.) Caloric, however, is now considered material, and a distinct fluid from that of light.

Solar heat is at present accounted for in a different way to that of considering the heat as extinguished light. Dr. Herschel has, from a series of experiments, of which we shall soon give an account, concluded, that the rays of caloric, or rays solely producing heat, are emitted from the sun, as well as from terrestrial bodies, affording light and heat: while the rays of light, or such as are essential to vision and colour, have not the property of producing heat. How far this conclusion is warranted, we shall have occasion hereafter to consider.

Besides the properties of light to be reflected and transmitted, and that of being absorbed and extinguished, we are presented with curious phenomena, arising from the attraction between this substance and other matter, which is the cause of the refraction and inflection of light. When a ray of light enters any transparent medium, in a direction perpendicular to the surface of the same, the ray will maintain its course in the same direction; but if the ray of light make any angle less than a right angle with the surface of the medium, it will not continue in the same direction, but will be drawn towards a straight line, perpendicular to the same surface, and passing through the medium at the point where the oblique ray enters. This line, in optical language, is called the perpendicular. The angle which the incident ray makes with the perpendicular is called the angle of incidence; and the angle which the ray makes with the same perpendicular, after it enters the medium, is called the angle of refraction. In all the degrees of obliquity at which a ray enters any medium, the sine of the angle of incidence has the same ratio to the sine of the angle of refraction.

The refracting power of different transparent bodies is not dependent upon one property alone; it appears, however, to be directly as their density, all other things being equal.

Inflammable bodies are found to refract light much more than bodies not inflammable. Sir Isaac Newton divided diaphanous bodies into two classes, each of which refract light as their density. The first consisted of the inflammable, in which it was much more than according to the ratio of their density.

The other class, which were not inflammable, appeared to obey the same law as to density, with the exception of the diamond and water. The former of these refracted in the compound ratio of inflammability and density; and although it was then not known to be inflammable, Newton strongly suspected it to be entirely an inflammable body; and that water which appeared to have an intermediate power between the two classes, he supposed, was partly inflammable.

these

These prophetic observations have been verified in the discovery of the diamond being pure carbon, and in the decomposition of water.

The late discoveries of Mr. Davy render it very probable that all compound bodies are composed of inflammable matter and oxygen. Hence it would seem, that the refractive power of bodies is less in proportion to the oxygen they contain. Sir Isaac Newton suspected that refraction was caused by inflammable matter alone, from which it would follow, that all diaphanous bodies contained inflammable matter. This, in all probability, is the case with the exception of oxygen. It has, however, been proved by M. Biot, that the refractive power of oxygen, although less than any substance in proportion to its density, is nevertheless appreciable. The same philosopher also ascertained that hydrogen refracts light in a ratio, independent of its density, higher than any other substance.

From the above facts we may, with some certainty, conclude, that the refractive power of bodies, or, in other words, their attraction for light, is in the compound ratio of their inflammability and density.

Light is not only attracted in passing through different media, constituting refraction, but it is attracted towards the sides of bodies by which it passes, and is then said to be inflected. When a beam of light is let through a small hole into a dark room, the rays are found to be drawn towards the sides of the hole, by which means they acquire a certain degree of divergence. In consequence of this change in the direction of the rays, the shadows of hairs, and other slender substances held in the beam of light coming through the aperture, are found to become enlarged in proportion to the distance of the place on which the shadow is cast. See INFLECTION.

From this circumstance Sir Isaac Newton concluded, that the rays of light must have passed as they are represented in *Plate IX. Optics, fig. 8.* in which X represents a section of the hair, and A D, B E, &c. rays of light passing by at different distances, and then falling upon the wall Q O. Since, when the paper which receives the rays is at a great distance from the hair, the shadow is broad, it must follow, as he observes, that the hair acts upon the rays of light at some considerable distance from it; the action being strongest on those rays which are at the least distance, and growing weaker and weaker on those which are farther off, as is represented in the figure; and from hence it comes to pass, that the shadow of the hair is much broader in proportion to the distance of the paper from the hair, when it is nearer than when it is at a great distance. It is of no moment, whether the hair be surrounded with air, or with any other pellucid substance. The shadows of scratches made in polished plates of glass, and the veins in the glass, cast the like broad shadows; so that the breadth of shadow must proceed from some other cause than the refraction of the air.

The shadows of all bodies, metals, stones, glass, wood, horn, &c. in this light, were bordered with three parallel fringes, or bands of coloured light, whereof that which was contiguous to the shadow was the broadest and most luminous, while that which was the most remote was the narrowest, and so faint, as not easily to be visible. The first or innermost fringe was violet, and deep blue next the shadow, light blue, green, and yellow in the middle, and red without. The second fringe was almost contiguous to the first, and the third to the second; and both were blue within, and yellow and red without; but their colours were very faint, especially those of the third. The colours, therefore, proceeded in the following order from the shadow: velvet, indigo, pale blue, green, yellow, red; blue, yellow,

red; pale blue, pale yellow, and red. The shadows made by scratches and bubbles in polished plates of glass, were bordered with the like fringes of coloured light. He also observes, that by looking on the sun through a feather, or black ribbon, held close to the eye, several rainbows will appear, the shadows which the fibres or threads cast on the retina being bordered with the like fringes of colours.

From comparing other experiments, in which a ray of light was made to pass through a hole into a darkened chamber, and then through a hole in a paste-board, first by the edge of a single knife, and then by the edges of two knives placed parallel to one another, Sir Isaac Newton concluded, that the light of the first fringe passed by the edge of the knife at a distance greater than the eight hundredth part of an inch, that the light of the second fringe passed by the edge of the knife at a greater distance than the light of the first fringe, and that of the third at a greater distance than that of the second; and that the light, of which the streams, observed in these experiments, consisted, passed by the edges of the knives at less distances than that of any of the fringes.

In another experiment, he placed at the hole a prism to refract the light, and to form, on the opposite wall, the coloured image of the sun; and he found that the shadows of all bodies, held in the coloured light between the prism and the wall, were bordered with fringes, of the colour of that light in which they were held; and comparing the fringes made in the several coloured lights, he found, that those made in the red light were the largest, those made in the violet the least, and those made in the green were of a middle size. Whence he inferred, that the rays which made the fringes in the red light, passed by the hair at a greater distance than those which made the like fringes in the violet; so that the hair, in causing these fringes, acted alike upon the red light, or least refrangible rays, at a greater distance, and upon the violet or most refrangible rays at a less distance, and thereby occasioned fringes of different sizes, without any change in the colour of any sort of light. It may, therefore, be concluded, that when the hair in the first observation was held in the white beams of the sun's light, and cast a shadow, which was bordered with three fringes of coloured light, those colours arose not from any new modifications impressed upon the rays of light by the hair, but only from the various inflections, whereby the several sorts of rays were separated from one another, which, before separation, by the mixture of all their colours, composed the white beam of the sun's light; but when separated composed lights of the several colours which they are originally disposed to exhibit. But for a fuller account of the author's curious experiments, and the conclusions drawn from them with regard to the inflection of light, we must refer to his well known treatise on Optics, p. 293. &c.

This action of bodies on light is found to exert itself at a sensible distance, though it always increases as the distance is diminished; as appears very sensibly in the passage of a ray between the edges of two thin planes at different apertures; in which there is something very peculiar; the attraction of one edge being increased as the other is brought nearer it. The rays of light, in their passage out of glass into vacuum, are not only inflected towards the glass, but, if they fall too obliquely, they will revert back again to the glass, and be totally reflected.

The cause of which reflection cannot be attributed to any resistance of the vacuum, but must be entirely owing to some force or power in the glass, which attracts or draws back the rays as they are passing into the vacuum. And this

this appears farther from hence, that if you wet the posterior surface of the glass with water, oil, honey, or a solution of quicksilver, then the rays which would otherwise have been reflected, will pass into and through that liquor; which shews that the rays are not reflected till they come to the posterior surface of the glass, nor even till they begin to go out of it; for if at their going out, they fall into any of the foresaid mediums, they will not then be reflected, but perfit in their former course, the attraction of the glass being in this case counterbalanced by that of the liquor.

Experiments, similar to those of sir Isaac Newton on inflected light, were prosecuted by M. Maraldi, whose observations chiefly respect the inflection of light towards other bodies, whereby their shadows are partially illuminated. *Ac. Paris. 1723. M. p. 159.* For an abstract, see Priestley's History, &c. of Light, &c. p. 521, &c. M. Mairan, without attempting the discovery of new facts, endeavoured to explain the old ones, by the hypothesis of an atmosphere surrounding all bodies; and consequently making two reflections and refractions of light that impinges upon them, one at the surface of the atmosphere, and the other at that of the body itself. This atmosphere he supposed to be of a variable density, and refractive power, like the air. M. du Tour succeeded Mairan, and imagined, that he could account for all the phenomena by the help of an atmosphere of a uniform density, and of a less refractive power than the air, surrounding all bodies. Du Tour varied the Newtonian experiments, and discovered in the colours produced by the inflection of light more than three fringes, which he exhibited distinctly in the following manner. He took a circular board, A B E D (*Plate IX. Optics, fig. 9.*) thirteen inches in diameter, the surface of which was black, except at the edge, where there was a ring of white paper, about three lines broad, in order to trace the circumference of a circle, divided into 360 degrees, beginning at the point A, and reckoning 180 degrees on each hand to the point E; B and D being each of them placed at 90 degrees. A slip of parchment three inches broad, and disposed in the form of a hoop, was fastened round the board, and pierced at the point E with a square hole, each side being four or five lines, in order to introduce a ray of the sun's light. Lastly, in the centre of the board C, and perpendicular to it, he fixed a pin, about one-third of a line in diameter.

This hoop being so disposed, that a ray of light entering the dark chamber, through a vertical cleft of two lines and a half in length, and about as wide as the diameter of the pin, went through the hole at E, and passing parallel to the plane of the board, projected the image of the sun and shadow of the pin at A.

In these circumstances he observed, first, that quite round the concave surface of this hoop, there was a multitude of coloured streaks; but that the space *m A n*, of about eighteen degrees, the middle of which was occupied by the image of the sun, was covered with a faint light only.

2. The order of the colours in these streaks was generally such, that the most refrangible rays were the nearest to the incident ray E C A; so that, beginning from the point A, the violet was the first, and the red the last colour in each of the streaks. In some of them, however, the colours were disposed in a contrary order.

3. The image of the sun, projected on each side of the point A, was divided by the shadow of the pin, which was bordered by two luminous streaks.

4. The coloured streaks were narrower in some parts of

the hoop than others, and generally decreased in breadth in receding from the point A.

5. Among these coloured streaks, there were sometimes others which were white, a line, or a line and a half in breadth, which were always bordered on both sides by a streak of orange colour, at least when the light of the sun was intense, and the chamber sufficiently dark.

From this experiment he thought it was evident, that the rays which passed beyond the pin were not the only ones that were decomposed; for that those which are reflected back from the pin were decomposed also: from which he concluded that they must have undergone some refraction. He also thought that those which went beyond the pin suffered a reflection, so that they were all affected in a similar manner.

In order to account for these facts, our author describes the progress of a ray of light through an uniform atmosphere which he supposes to surround the pin, and shews that the differently refrangible rays will be separated at their emergence from it; but he refers to some experiments and observations in a future memoir, to demonstrate that all the coloured streaks are produced by rays that are both reflected and refracted. *Memoires Présentés, vol. v. p. 636. 641.*

From other observations, M. Du Tour concludes, that the refracting atmospheres, surrounding all kinds of bodies, are of the same size; for when he placed a great variety of substances, and of different sizes also, he always found the coloured streaks of the same dimensions. He also observes, that this hypothesis contradicts an observation of sir Isaac Newton, *viz.* that those rays which pass the nearest to any body are most inflected. *Mem. de Mathem. and de Phys. vol. v. p. 650, &c.* or Priestley, *ubi supra, p. 531, &c.*

M. Le Cat found that, in some cases, objects appear magnified by means of the inflection of light. Looking at a distant steeple, when a wire of less diameter than the pupil of his eye was held pretty near to it, and drawing it several times betwixt his eye and that object, he was surprised to find that, every time the wire passed before his pupil, the steeple seemed to change its place, and some hills beyond the steeple seemed to have the same motion, just as if a lens had been drawn betwixt his eye and them. This discovery led him to several others depending upon the inflection of the rays of light. Thus, he magnified small objects, as the head of a pin, by looking at them through a small hole in a card; so that the rays which formed the image, must necessarily pass so near the circumference of the hole, as to be attracted by it: he also exhibited other appearances of a similar nature. *Traité des Sens, p. 299, &c.* Priestley, *ubi supra, p. 537, &c.*

Several coincident facts induced sir Isaac Newton to believe that reflection, refraction, and inflection resulted from the same cause, namely, attraction: Of the two latter of these properties resulting from this cause there can be little doubt; but the laws by which the first is governed appears to depend rather upon the repulsion than the attraction of the medium. The greatest mystery attending reflection, is in the circumstance of the under surface reflecting light equally with the upper surface. This part certainly goes far to prove, that the reflection of light is not to be explained by considering the reflecting surface as a hard substance, from which the elastic particles of light are repelled, particularly since the reflection from the under surface of any medium is in the inverse ratio of the density of the medium, beyond the reflecting surface, and is greatest when the surface is bounded by a vacuum.

Although

Although sir Isaac Newton does not attempt to explain the reflection from the upper surface by the attraction of the medium, he seems to be of opinion, that the light reflected from the under surface is attracted by the same medium in a contrary direction.

Hence he concludes, that this reflection is less as the density of the under medium is greater, the attraction of the first medium being counteracted by that of the second.

This explanation does not appear satisfactory. If the reflection of the rays from the under surface depended upon the attraction of the same medium, it would not produce the same phenomena which result from the reflection at the upper surface, and which is clearly caused by something like repulsion.

When a ray of light falls upon any reflecting surface, we cannot for a moment suppose that any attraction of the medium could cause it to be reflected, since the effect produced can arise only from a repellent force, exerted in a direction perpendicularly from the surface of the body. And that the elastic force existing between the body and the light is so perfect, as to make the angle of reflection equal to the angle of incidence. Newton very properly argued, that the reflection could not take place from the particles of light striking the hard parts of bodies, on account of the numerous interstices existing between their molecules; on the contrary, he supposed the light which struck the solid parts became extinguished.

It may here be observed, that it is equally difficult to explain the action of one solid body upon another, as it may easily be proved that they do not come into absolute contact in any instance.

When we attempt to unite the surfaces of fractured bodies, we cannot, in most instances, bring the parts within the sphere of attraction; and even where this can be effected, as in two bright surfaces of lead, it may be proved that the parts do not touch.

It seems difficult to conceive how an atmosphere of hydrogen should by its pressure support a column of mercury, by the mere action of the solid parts of the two surfaces, since every particle of hydrogen would be required to act upon 2700 particles of mercury.

We may, without much gratuity, consider all solid bodies as compounded of two species of matter; the one possessing so great an attraction as to bring the particles into absolute contact, and the other so completely repellent of itself, as to be infinitely dissipated, if it were not for its attraction for matter with which it combined. The former of these properties is peculiar to all ponderable matter, the latter to the repellent matter denominated light and caloric, and perhaps electricity and magnetism. Daily experience shews, that the constitution of solid and liquid bodies is dependent upon a certain quantity of caloric, opposed to the opposite and contending force of the attraction of the particles of the solid body, by which also their volumes and relative gravities are governed. Hence we may expect, that when the attraction of the body for caloric is greater than the repellent force of the caloric, the body will possess what is called a greater capacity for heat, and the reverse of this will take place from a contrary change.

Conceiving the above to be the case, it will be easy to infer, that the surfaces of bodies must be surrounded by atmospheres of caloric, and it doubtless is by these atmospheres that we are to account for the difficulty of bringing two surfaces together, and by which we may also explain the action of the hydrogenous atmosphere upon the mercury. May not we, therefore, draw this general con-

clusion, that the particles of all solid matter can never be brought into contact, either in their internal arrangement or on the surfaces; and that the repulsion existing between the particles of bodies, whether in the same or in two different bodies, is solely to be attributed to the repulsion between the particles of caloric? And may we not further conclude, that the particles of bodies, in all situations, and under all circumstances, are constantly exerting an attractive force tending to their ultimate contact? If it should be admitted that caloric is the cause of repulsion, elasticity must be therefore dependent upon its presence, acting in a contrary direction to the attractive force. Hence it would be very absurd to say that caloric itself should be elastic, because this property depends upon two forces. When caloric, therefore, is reflected from the surface of a body, we are to attribute its return to the repulsion between itself and the caloric of the body, the solid matter having nothing to do with the reflection. The rays of caloric, passing from one body to another, may, from what has been observed, be caused by the joint action of two forces. The one arising from the repulsion of the particles of caloric for each other at the heated body, and the other from the soliciting force of the attraction between the caloric and the receiving body. When, however, the repulsion between the radiant caloric and the caloric of the receiving body increases in a greater ratio than their attraction, the radiant caloric will be reflected. A contrary effect would cause them to be absorbed.

When the direction of the radiant caloric is perpendicular to the receiving surface, its projectile force conspires in the greatest degree with the attraction of the body, and less of course in proportion to its obliquity. Does not this agree with the established fact, that the reflection of both light and heat is inversely as the angle of obliquity the ray makes with the surface.

Light and caloric, so far as their reflection is concerned, are so similar, that we may with great propriety apply the same reasoning to the reflection of light, and the same absurdity would arise in considering light as consisting of elastic particles, because this would imply the existence of attractive matter in its composition. When, therefore, light is reflected, we are to consider with sir Isaac Newton, that no action takes place between the particles of light and the solid matter to produce the effect; but, agreeably to our hypothesis, we must conclude that the reflection is caused by the repulsion between the particles of light and the caloric of the body.

If the reflection is caused by the caloric atmosphere on the surface of the body, we may perceive an easy way of explaining why the reflection of light is confined to the surface of bodies, and why the under surface should reflect as much as the upper one.

This hypothesis does not disagree with the fact, of the reflection being, like the refraction, as the density of the medium, because the increase of density will be attended with increase of attraction between the particles, and it will be evident, that the density of the caloric atmosphere will be in the same proportion, therefore reflection will be as the density.

What we observed respecting the obliquity of the rays of caloric, will hold good with respect to light. When the obliquity of rays of light, which fall upon transparent bodies is such, that the repulsion between the light and the caloric of the body is greater than the projectile force of the ray added to the attraction, the medium of the angle of obliquity is called the angle of total reflection. When the reflection is from the under surface, the attraction of the

medium conspires with the repulsion between the light and the caloric atmosphere to cause total reflection, and the angle of total reflection ought to be rather greater at the under than the upper surface, which has been said to be the case; at least it has been observed by Bouguer, that more light is reflected from the internal than the external surface. The additional force given by the attraction of the medium to cause the internal reflection, will be counteracted by any other medium beyond this surface, and this accounts for the transmissibility under such circumstances. Agreeably to the established notion, therefore, we hold, that refraction and inflection are caused by the attraction existing between the light and the body. But it is more consistent with our views, to consider reflection and transmissibility as being caused by the repulsion existing between the particles of light, and between light and the caloric atmosphere of the body, modified and altered under certain circumstances, by the attraction between light and the medium.

Were we only acquainted with the fact, that light was attracted by ponderable matter, we should, from our knowledge of gravity, conclude that the refraction would be as the density of the medium; and we are not so much surprised at the circumstance of light being more attracted by inflammable than other bodies, when we recollect the great quantity of light and heat furnished by those bodies, when they combine with oxygen; and at the same time remember that the attraction of one body for another is as the quantity with which it can combine.

Some very curious facts relative to the properties of light have lately been discovered by M. Malus. (See Memoires de la Société d'Arcueil, vol. ii. p. 143.) It appears from the researches of this philosopher, that light is changed in its properties by particular reflection. If, says he, we take two plates of glass, and let two of their surfaces make an angle of 70° 50'; then imagine a line which shall bisect this angle. Any ray of light falling upon one of these surfaces, in a direction parallel to the above bisecting line, will be reflected to the other. The light, however, is so changed in its properties by the first reflection, as to be completely unreflectible of being reflected from the second surface; but the whole of it will be transmitted. This new property of light has been applied, with some success, to explain the mysterious phenomenon of double images formed by the Iceland crystal, calcareous spar, &c. If it be asked, how it happens, since we ascribe the reflection of the rays to the action of the whole surface of the body without contact, that all the rays are not reflected from every surface; but while some are reflected, others pass through, and are refracted? The answer given by Sir Isaac Newton is as follows:—Every ray of light, in its passage through any refracting surface, is put into a certain transient constitution or state, which in the progress of the ray returns at equal intervals, and disposes the ray at every return to be easily transmitted through the next refracting surface, and between the returns to be easily reflected by it; which alternation of reflection and transmissibility appears to be propagated from every surface and to all distances. What kind of action or disposition this is, and whether it consists in a circulating or vibrating motion of the ray, or the medium, or somewhat else, he does not inquire; but allows those who are fond of hypotheses to suppose, that the rays of light, by impinging on any reflecting or refracting surface, excite vibrations in the reflecting or refracting medium, and by that means agitate the solid parts of the body. These vibrations, thus propagated in the medium, move faster than the rays, so as to overtake them; and when any ray is in that part of the vibration which conspires with its motion, its velocity is in-

creased, so that it easily breaks through a refracting surface; but when it is in a contrary part of the vibration, which impedes its motion, it is easily reflected; and consequently, that every ray is successively disposed to be easily reflected, or transmitted by every vibration which overtakes it. The returns of which disposition of any ray to be reflected, he calls *sits of easy reflection*; and those of its disposition to be transmitted, he calls *sits of easy transmissibility*; and the space between the returns, *the intervals of the sits*. The reason, then, why the surfaces of all thick transparent bodies reflect part of the light incident on them, and refract the rest, is that some rays in their incidence are in *sits of easy reflection*, and others of easy transmissibility. See REFLECTION, REFRACTION, and OPTICS.

Having given some idea of the nature of light in general, we shall next point out the different sources of light; and under each of these heads, detail its more particular properties as a chemical agent, and its connection with the matter of heat.

*Solar Light.*—We have already stated the immense velocity with which light is emitted from the sun's body; and it will be easy to conceive that it cannot suffer any change in velocity or direction, till it meets with some ponderable matter. In approaching any planetary body, such as our earth, we have reason to believe that they are mutually attracted. Rays falling perpendicularly upon the atmosphere are equally attracted on every side, and come in a straight line to the earth; while those rays which fall obliquely are bent out of their original direction; and since the atmosphere is not of uniform density, such oblique rays will come to the earth in curved lines. If our atmosphere were of uniform density, the refraction would not be altered; but the oblique rays falling upon its surface, would be reflected in a very great degree; a circumstance which would deprive us of much of the sun's light. No doubt a great quantity of light becomes extinguished in its passage through the aerial medium, as we may justly learn from the difference of intensity in the light, at different altitudes of the sun; but how much must this loss of light appear, when we recur to the statement already made, namely, that the whole effect of the sun's light would be lost by passing through 679 feet of seawater, and that the same effect would take place by its passage through 3,110,310 feet of air.

The following is a table from M. Bouguer, shewing the intensity of the sun's light, at different altitudes, and the thickness of air it has to penetrate at each angle.

Sun's Altitude.	Thickness of Air in Toises.	Intensity of Light, the whole being 10,000.
90°	3911	8123
80	3971	8098
70	4162	8016
66 11'	4295	7968
65	4315	7951
60	4516	7866
55	4776	7759
50	5104	7624

L I G H T.

Sun's Altitude.	Thickness of Air in Toises.	Intensity of Light, the whole being 10,000.
45°	5530	7454
40	6086	7237
35	6813	6963
30	7784	6613
25	9191	6136
20	11341	5474
19 16'	11744	5358
19	11890	5316
18	12515	5143
17	13220	4954
16	14000	4753
15	14880	4535
14	15880	4301
13	17012	4050
12	18344	3773
11	19908	3472
10	21745	3149
9	23975	2797
8	26672	2423
7	29996	2031
6	34300	1616
5	39893	1201
4	47480	802
3	58182	454
2	74429	192
1	100930	47
0	138823	6

The property of light to be refracted had been known long before the time of Newton; but this philosopher was the first who discovered that the light of a sun-beam was not refracted uniformly. If light were uniformly refracted, the rays which enter any plane surface would retain their relative inclination to each other, while they pass through the diaphanous medium; and the same after their emergence, if the surface were a plain. Sir Isaac Newton, however, has proved, by a series of elegant experiments, strengthened by

able reasoning, that the different parts of a solar beam are not refracted in the same degree. He caused a beam of light to pass through a small hole in the window-shutter of a dark room, making the pencil of rays to fall upon one side of a triangular prism. These rays were so refracted as to come out at another side of the prism. These emergent rays, however, were not parallel as they entered the other side; but each made a certain angle with the other, in consequence of some being more bent or refracted than the other. The image, or spectrum, formed by these rays upon a sheet of white paper, instead of being round, which would have resulted from uniform refraction, was of an oblong shape. Those rays which had been the least refracted occupied one end of the spectrum; and those most refracted, the other. The former tinged the paper of a red colour, the latter a violet colour; the intermediate rays exhibiting different colours, which were in the following order: red, orange, yellow, green, blue, indigo, and violet.

In order to shew that each of these rays had specific properties, not depending upon the medium they passed through, he caused them to pass through a second prism, sometimes together, and sometimes separately; but he always found them to retain their original properties.

By means of two contiguous spectrums, he caused a ray of one colour in the one to unite with a different colour in the other, and produced different compound colours. The yellow of one with the red of the other produced orange, which had the appearance of the primitive orange ray, and differed from it only in being decomposable into its original elements.

He ascertained by direct experiment, that those rays which were most refrangible were also most reflexible. In consequence of this property, he could reflect the different coloured rays separately. He caused the light to fall upon a prism, so laid upon a similar prism as to constitute a parallelepiped, so that the rays were parallel at their emergence; but upon turning the two prisms round their common centre, the light became reflected from the upper contiguous surface, and all the rays in their turns arrived at the angle of total reflection. But he observed that those which had been most refracted were first reflected; the least refrangible being the last.

These valuable facts were used by this able philosopher to explain the colours of natural bodies. He has shewn that colour is not a specific property of bodies, but is caused by the different rays of light being reflected from the surface of the body; the rest of the rays passing into, or through the body. Since the time of this philosopher, it has been objected, that the seven colours above mentioned are not primitive. It seems very obvious that there can be only three primitive colours, namely, red, yellow, and blue; since all the colours can be made by means of these. It has lately been advanced by Prieur, that the primitive colours are violet, green, and red: that the yellow is formed with red and green, the latter being in excess; and that when the red is in excess, they form orange; the green and violet form blue.

The colours excited by the different refrangible rays do not appear to determine what are the primitive colours, since we find that different rays are capable of producing the same colour, as a mixture of the yellow with the red, produces orange. And it must be admitted, that the violet, rays excite, in some degree, the idea of red along with the blue; as in the green, the yellow and blue may be discerned, but none of the red.

When the different coloured rays are mixed together, either by recomposition, or by getting each colour from a separate

## L I G H T.

ferre spectrum, the result will be white light. Hence Sir Isaac Newton concluded, that when the rays are promiscuously reflected from any surface it will appear white. It was found by Sir Isaac Newton, and has since been confirmed by the experiments of Dr. Herschel, that the different coloured rays have not by any means the same illuminating power. The violet rays appear to have the least luminous effect, the indigo more, the blue a little more, the green very great, between the green and the yellow the greatest of all, the yellow the same as the green, and the red less than the yellow. When the solar rays are passed through a convex lens, or reflected from a concave, a very intense heat is produced by the concentration of the rays. Count Rumford has shewn, that when the rays of the sun are made to pass through a certain aperture, and fall upon any substance to be heated, while the same area of light is made to pass through a lens, in the focus of which the same quantity of matter is to be heated, they become heated in the same time to the same degree. Nothing is better known, in short, than that the rays of the sun are capable of exciting sensible heat. Newton, and the philosophers of his age, accounted for heat by the motion excited in the parts of the body by the agitating power of the absorbed light. Melville supposed that the heat was expelled from the terrestrial matter by the light. At present, it is generally admitted, on the strength of some valuable experiments made by Dr. Herschel, that the rays of light and caloric are separately emitted from the sun, the luminous rays producing light, and the calorific, heat.

This philosopher introduced a beam of light into a dark room, which was decomposed by a prism, and then exposed a very sensible thermometer to all the rays in succession, and observed the heights to which it rose in a given time. He thus determined, that the heating power of the red is to that of the green rays as  $2\frac{1}{2}$  to 1, and  $3\frac{1}{2}$  to 1 in red to violet.

On repeating these experiments, he found that the greatest quantity of calorific rays were, even beyond the coloured spectrum at about  $\frac{1}{2}$  an inch, from the commencement of the red rays. At a greater distance from this point it began to diminish, but was very perceptible even at the distance of  $1\frac{1}{2}$  inch.

It will appear from what has been stated, that these calorific rays are less refrangible than the rays of light; hence the calorific focus will fall beyond that of the luminous. Dr. Herschel made an experiment to verify this inference, but did not come at any thing very conclusive. He afterwards made experiments to collect these invisible calorific rays, and caused them to act independently of the light, by which he concludes, that they are sufficient to account for all the effects produced by the solar rays in exciting heat; that they are capable of passing through glass, and of being refracted and reflected, after they have been finally detached from the solar beam.

If we are to consider these invisible rays as being truly the same with artificial heat, emanated from terrestrial bodies, under the temperature of  $800^{\circ}$  of Fahrenheit, some of the experiments of Dr. Herschel are strongly at variance with some of the experiments of Mr. Lesley, detailed in his work, entitled "An Enquiry into the Nature of Heat," especially so far as relates to the transmission of heat through transparent bodies. It appears from the facts given by Mr. Lesley, that the heat of  $212^{\circ}$  of Fahrenheit is not transmitted by glass in the radiant form, but is first absorbed by the glass, and radiated afresh from its opposite surface. He was led to this conclusion by the fact, that more heat passed through white paper than the glass. And what still more confirms this idea, he found equally as much heat passed through two plates of tin, one side of

each being blacked, and the other polished. When the bright sides were placed together, and the black outwards, it transmitted as much as the glass; but when the black sides were together, and the bright sides outward, there was no perceptible quantity passed through.

That culinary heat does not pass directly through glass, may be tried by holding a pane of glass before a heated body, and alternately holding the hand on each side the glass. After some time, however, the glass gives heat to the hand, proving that the heat has been transmitted; but this will be found to result from a second radiation, and would have been more abundant, if a plate of metal, painted black, had been in the place of the glass.

The heat from the sun's rays is not so affected. It requires no perceptible time to pass through several thick prisms of glass, and when we hold a convex lens in the sun's beams, we have instantaneous heat produced upon any opaque body in its focus.

We have not yet sufficient ground to establish the identity of light and heat; but if Dr. Herschel's experiments be correct, we must either conclude that the solar calorific rays are of a different nature from the invisible rays, or that solar light is converted into caloric from heated bodies. The same philosopher, however, has made the same experiments with invisible culinary heat, and with similar results. How shall we reconcile the seeming contradictions? Dr. Herschel used two thermometers, one of which was his standard. Mr. Lesley used the differential thermometer, an elegant instrument, invented by himself. Dr. Herschel began his experiments with a red-hot cylinder, and continued them till it became invisibly cold. Mr. Lesley used a cannister filled with boiling water. A more particular set of experiments is still wanting to clear up this mysterious subject.

Dr. Herschel has also given us some useful experimental facts on the relative quantities of light and heat transmitted by different substances. The following Table shews the quantity of light and heat, stopped by colourless and transparent solid substances.

TABLE I.

Substances.	Stops of 1000 Paris	
	Heat.	Light.
Blueish white glass - -	250	80
White flint ditto - -	91	34
Green crown ditto - -	259	203
Coach ditto - -	214	168
Iceland crystal - -	244	150
Talc - -	139	90
Calcinable talc - -	184	288

TABLE II.

Shewing the quantity of light and heat stopped by coloured substances.

Substances.	Stops out of 1000.	
	Heat.	Light.
Very dark red glass - -	800	$999\frac{1}{3}$
Dark red - -	666	$999\frac{1}{3}$
Orange - -	614	779
Yellow - -	333	819
Pale green - -	633	535
Dark ditto - -	849	949

Substances.	Steps out of 1000.	
	Heat.	Light.
Blueish ditto	768	769
Pale blue	812	684
Dark ditto	362	801
Indigo	633	999 <sup>1</sup> / <sub>5</sub>
Pale indigo	532	778
Purple	583	993
Violet	489	955

TABLE III.

Shewing the stopping property of what Dr. Herschel calls scattering substances.

Substances.	Steps out of 1000.	
	Heat.	Light.
Rough crown glafs	464	854
Rough coach ditto	571	879
Doubly rough	667	932
Second doubly rough	735	946
The two first together	698	969
The two next together	800	979
The four first together	854	995
Olive colour burnt in	839	984
Calced talc	867	996
White paper	850	994
White linen	910	952
White Persian	700	916
Black mufsin	714	937

TABLE IV.

Shewing the stoppage out of 1000 of the prismatic red rays, and the invifible rays.

Substances.	Rays.	
	Red.	Invifible.
Blueish white glafs	375	000
Flint glafs	143	71
Crown glafs	294	000
Coach glafs	200	182
Iceland cryftal	250	143
Calced talc	433	—
Dark red glafs	602	250
Orange	500	000
Yellow	417	273
Pale green	588	200
Dark green	786	375
Blueish green	462	500
Pale blue	700	800
Dark blue	71	750
Indigo	367	107
Pale indigo	313	222
Purple	444	250
Violet	400	273
Crown glafs, one fide rough	389	250
Coach glafs, ditto	500	600
Crown glafs, both fides rough	471	500
Coach glafs, ditto	833	600
Calced talc	737	714

TABLE V.

Shewing the stoppage of rays of flame, fire, and invifible rays from a flove.

Substances.	Rays.		
	Flame.	Fire.	Invifible.
Blueish white glafs	625	750	700
Flint glafs	595	750	533
Crown glafs	636	722	783
Coach glafs	458	714	625
Iceland cryftal	510	756	726
Talc	375	713	615
Very dark red glafs	636	613	—
Dark red	526	573	630
Orange	560	643	524
Yellow	523	685	531
Pale green	500	688	632
Dark green	739	745	700
Blueish green	652	696	556
Pale blue	609	676	548
Dark blue	619	704	632
Indigo	679	721	659
Pale indigo	571	655	700
Purple	520	679	730
Violet	500	615	684
Crown glafs, one fide rough	741	723	775
Coach glafs, ditto	667	758	741
Crown glafs, both fides rough	615	791	833
Coach glafs, ditto	680	854	709
The two laft but two, together	720	849	—
The two laft together	667	897	—
The four laft together	870	902	—
Olive colour, burnt in glafs	792	849	636
White paper	792	912	535
White linen	690	910	457
White Persian	593	829	—
Black mufsin	565	706	—

The experiments in the first, second, and third tables, were made by letting the sun's rays act directly upon one thermometer, while the same light acted upon another after passing the different substances. The numbers in the tables are the ratios of the differences of the degrees of each, after being acted upon for a given time. Table IV. was made in the same way, the red rays and the invifible rays being each separated by the prism, making two sets of experiments. In each of these, the red, or the invifible, acted on one thermometer, and on the other through each of the substances.

Table V. is formed from three sets of experiments, made at different times, by causing, in the first, the rays of the flame of a candle to act upon one thermometer directly, and upon the other through the substances. In the second set the rays of a common fire were used; and in the third, the invifible rays of an iron flove. See Phil. Transf. for 1800.

An abundance of useful knowledge is to be derived from these researches, which may be of the utmost importance to society, as well as in giving aid to different branches of science.

In delicate experiments of this kind, the thermometer seems to be the most important of the apparatus. The smallness of the scale, and the want of sensibility in those used by our ingenious experimenter, were certainly very objectionable, when compared with the differential thermometer of Lesley. A repetition of these experiments, under

such an advantage, is highly to be recommended. We have already pointed out some contradictions between these and Lefley's experiments.

By comparing the effect of the substances upon the solar invisible rays in Table IV, and upon the invisible rays from the iron stove in Table V., we are led to some very singular conclusions. It appears, for instance, that flint-glass stops none of the invisible rays of the spectrum, although the same substance stops 143 out of 1000 of the red rays, 91 of 1000 of direct solar heat, 34 of the direct light. Hence it would seem that calorific rays mixed with the luminous, must constitute the 91 of 1000, since all the invisible rays pass through. We must from these data conclude, that either the light of the solar spectrum produces heat, or that the calorific part in the coloured rays is of a different nature from the invisible calorific rays. If the latter be admitted, we have as much reason to consider the solar beam as consisting of different kinds of heat, as well as of light.

These anomalies are still increased, when we turn to Table V., where we find that the same flint-glass stops out of 1000 rays 730 invisible rays from a stove, which would seem to establish that this calorific matter is still different from both the visible and invisible calorific of the sun; and in the experiments of Mr. Lefley, calorific appears to possess still very different properties.

We here see so much mystery and contradiction, that we must wait for more particular research. It is unlike the simplicity of nature; the fault must, therefore, rest with the philosophers.

Sir Isaac Newton, on finding so many different species of light, was unwilling to make so many fluids, but supposed they differed in the size of their particles; the largest being the least refrangible, and the smallest the most. The same thing would take place from the same particles moving with different velocities; the most refrangible moving with the least, and the least refrangible with the greatest velocity.

We have already stated a fact discovered recently by Malus, that light acquires new properties by a peculiar reflection. Does it then appear impossible that it should not be changed in passing through diaphanous media? May not that which moves with the greatest velocity have a greater portion converted into heat; or, in other words, may not this conversion be as the velocity? This idea is strengthened, from the circumstance of calorific rays being found throughout the spectrum. The greatest objections raised to this idea of light and heat being excited by the same rays moving with different velocities, are founded on the facts of combined light in phosphorescent bodies, and in the chemical effects which were thought to be peculiar to light. In our next subject, however, we shall shew that all the chemical effects producible by light can be produced by heat.

Besides the properties of the solar beams to produce heat and light, we find it to have other properties equally important to the animated world. This is most conspicuous in the economy of vegetables. It has been many times proved, that vegetables, growing without light, would not, in the first place, have more tendency to grow upwards than in any other direction. This arises from an evident attraction existing between light and living vegetables. This fact is familiar to those who have placed trees in windows. It is observable, that they always lean towards the light. The same effect would doubtless take place, if one side of a vegetable were shaded in the open air. The attraction of light is probably not the same for different vegetables; by which we may account for the different forms of trees. This is rendered plausible, when we contrast the spreading

branches of the oak with the towering branches of the poplar.

Experience has long ago established, that vegetables become delitute of smell and colour, and lose much of their combustibility, by growing in the dark. We find in Dr. Black's lectures, an account given by the celebrated Dr. Robinson of Edinburgh. In the drain of a coal-work under ground, he accidentally laid his hand upon a very luxuriant plant, with large indented foliage, and perfectly white. He had not seen any thing like it, nor could any one inform him what it was. He had the plant with a sod brought into the open air in the light. In a little time the leaves withered, and soon after new leaves began to spring up, of a green colour, and of a different shape from that of the old ones. On rubbing one of the leaves between his fingers, he found that it had the smell of common tanfy, and ultimately proved to be that plant, which had been so changed by growing in the dark. Indeed it was recollected that some soil had been taken into the drain from a neighbouring garden, some time before it was found so altered.

This effect of light is not less conspicuous in the growth of celery. By covering it with earth, the light is shut out, which would very soon turn it green, and make its flavour so strong as to render it unfit to be eaten, at the same time that it would render it more fibrous and tenacious.

From the circumstance of light giving odour and inflammability to vegetables, and since these properties are most common to bodies containing hydrogen, it would appear that light was essential to the production of hydrogen, perhaps by expelling oxygen; and hence it would also appear that hydrogen is necessary to the colour of vegetables. It has been asserted by Humboldt, that he found vegetables growing in the dark mine, having their natural colour, but these plants were enveloped by hydrogen.

Light is found to produce various chemical changes upon bodies. When the oxyd of silver is precipitated from nitric acid by muriatic acid, the insoluble muriat is at first white, and if kept in the dark at the common temperature, would doubtless remain so for an indefinite length of time. If, however, it be exposed to the light for a little time, it begins to assume a purple colour, and ultimately becomes black. This effect takes place more rapidly according to the intensity of the light. Hence it has been proposed to measure the intensity of light by the time of its changing. An instrument has been invented for this purpose by Mr. Lefley. See PHOTOMETER.

The general effect of light, as a chemical agent, appears to consist in disengaging the oxygen, or an acid from bodies which it effects, no doubt, by lessening the affinity of the base for oxygen, or the saline base for the acid. Hence, we find light is capable of decomposing those oxyds and salts, in which the oxygen or acid is held by a weak affinity. It therefore detaches oxygen from the oxyds of gold, platinum, silver, and the peroxyd of lead; also from nitric and liquid oxymuriatic acid. Dr. Herschel, in his experiments upon light, finding that the solar spectrum had different illuminating powers in different parts, conjectured that the power of the sun's light to effect chemical changes, might principally belong to some particular part of the spectrum, and it appears that this ingenious has been confirmed by experiments made by Dr. Woollaston, and also by Ritter. It appears that the invisible rays have no action upon the muriat of silver, the red rays a little more, and so on, increasing to the utmost boundary of the violet ray; but the maximum of effect was found at some distance beyond the violet. It appears, therefore, from this curious fact,

fact, that the solar beam consists of rays which have three distinct effects, one producing light, another heat, and a third producing neither, but which effect the greatest chemical changes in the least time.

Some experiments lately made by Guy Lussac and Thénard, and detailed in their work entitled "Recherches Physiques-Chimiques," vol. ii. p. 186, go far to prove that the chemical changes produced by the solar rays are not dependent upon any specific property of light, as they have produced similar effects by heat alone. Dry oxy muriatic acid gas was not decomposed by light nor heat. Liquid oxy muriatic acid was decomposed by a light not strong, and by a heat equal to obscure red. Nitric acid by the same heat. Oxy muriatic acid gas mixed with hydrogen by light, and by heat equal to 125 to 160° centigrade. The fame was decomposed slowly by diffuse light, but scarcely any at less than 120° centigrade. The first oxyd of mercury was converted into the second oxyd, and running mercury by diffuse light; and the same by heat. The peroxyd of lead was changed into the red oxyd, oxygen gas being disengaged by a vivid light; and the same was produced by a gentle heat. The oxyds of silver and platina were decomposed by light and by a gentle heat.

They next exposed vegetable colours to the action of light as well as heat.

A vegetable rose-colour from saffron became white in a short time by light; and the same by exposure for an hour to 160° cent.

Log-wood dye was changed to dark red by light, and by exposure 1½ hour to 180° cent.

Brazil-wood dye became white by light, and by 180° of heat, for two hours.

The orange colour of Indian saffron became a dull red by light. The fame was produced by 200° of heat, for an hour and a half.

Yellow colour, from woad, was changed to ochre colour by light, and by 210° of heat applied for two hours and a half.

In all the effects of light we have hitherto enumerated, although we have shewn that a mutual attraction exists between light and other matter, we have not adverted to its remaining in bodies from which it may be eliminated without change. Several bodies appear, however, to possess the property in a remarkable degree. Indeed, according to experiments of father Becaria, almost any substance exposed to the light of the sun for a certain time, appeared luminous when brought into a dark room. This he found to be the case, when he made his own hand the subject of experiment. This property is soon gone in moist bodies; but is restored by fresh exposure to light. The substance most remarkable for retaining this quality is Canton's phosphorus, which consists of sulphur and lime. It is prepared by stratifying oyster-shells with sulphur in a crucible, and exposing them to the heat of a brisk common fire. The lime of the shells becomes impregnated with the sulphur, and they are then broken to pieces, and kept for use in a stoppered phial. This substance has the property of shining in the dark, after exposure to the sun's light, for a short time. Its brightness is such, as to point out the hour of the night. If it be kept in the dark, however, for a certain length of time, it becomes less bright, and ultimately loses its shining property; which it re-acquires by exposure to the light. This light is not dependent upon any combination, since it possesses this property without oxygen, and is not increased by its presence. Heat causes it to shine brighter; but it gives out its light sooner, which is only restored by new light.

Canton, the ingenious discoverer of this substance, introduced equal quantities of it into two glass globes, and exposed them to the sun equally, to give them their greatest luminous power. They were then taken into a dark room, when they were equally luminous. One of them was now placed in boiling water, by which means it became much brighter, but it ceased to be luminous in ten minutes; while the other continued to shine for two hours after. After the latter, however, had ceased to shine, it became luminous by the application of heat. It appears, by the account of this author, when it had ceased to shine at one temperature, it always gave out light in a greater, even to the point of ignition; but never after at the same, or a lower temperature, till it had been exposed anew to the sun's light.

These curious facts, on a first view, seem to prove that the light of this substance is derived from the sun's rays, which enters into combination with it, and is eliminated in the dark. This supposition, however, is rendered improbable by other facts. When it has ceased to shine, its property is restored by any of the coloured rays of the solar spectrum. It ought, therefore, to emit that particular light only to which it has been exposed, but contrary to this, under all circumstances, it gives out the same coloured light, which is generally white.

It seems more agreeable to the phenomena to suppose, that the influence of the light upon this substance consists in exciting some chemical action in the body, which cannot be produced by heat, or, perhaps, the phenomena may be electrical, since we find that the electric spark, as well as light, is capable of giving it its luminous property.

A great variety of substances have the property of giving out light by different treatment, some by heat, others by rubbing, and by percussion. Most of the earthy salts have the property of shining in the dark, by being laid upon an iron plate, heated a little short of ignition. Fluat of lime is by far the most brilliant by this treatment. The fame is visible, though in a less degree, in all the carbonats of lime, and in carbonats and sulphat of barytes, and also carbonat of strontian.

Several of the gems have the property of shining by rubbing. Quartz pebbles, rubbed briskly together, in the dark, give brilliant flashes, accompanied by a peculiar odour not unlike that produced by the wheels of a carriage grinding upon stones. The tourmalin also gives out light by rubbing. The shining property of this class of bodies is the same in vacuo, and any of the gases. The cause of these appearances is not even guessed at; they do not acquire these properties from the sun's light, like the phosphorus of Canton.

We are in possession of a number of curious facts relative to phosphorence of animal and vegetable substances. Canton has furnished a number of interesting experiments upon fish and the flesh of animals: and the subject has since been investigated and extended by Dr. Hulme. The flesh of animals, particularly veal, at a certain period after death, begins to be luminous, and continues so for some time. The light is extinguished when the meat has arrived at a certain state of putrefaction. This property, however, is more conspicuous in fish, and sea-fish more than that of fresh-water. A series of experiments is given by Dr. Hulme in the Philosophical Transactions for 1800, page 161.

He generally took about four drachms of the substance of different kinds of fish. This he put into a three-ounce phial, to which he introduced two drachms of sulphat of magnesia, dissolved in two ounces of cold spring-water, but occasionally he used other salts.

Two drachms of the flesh of the herring were put into the solution of sulphat of magnesia. On the second evening he perceived a ring of light round the top of the liquid, but it was dark below. On shaking the phial, the whole became beautifully luminous, and remained in that state. On the third night the light had again risen to the top; but the ring was not so bright as on the preceding night, nor was it so bright after shaking as on the first occasion. In another experiment, the light disappeared entirely on the third night. The same experiment was made with sea-water. On the second night the liquid was dark; on the third lucid; on the fourth very luminous; on the fifth it began to decline; on the sixth it became less; and on the seventh quite gone. At this period, neither the fish nor the liquid had any smell of putrefescence. The same took place in a second experiment. In another experiment, he used four drachms of the roe of the herring, two drachms of sulphat of magnesia, and two ounces of water, as before. On the second night, on shaking the phial, the liquid was luminous; it remained so on the third and fourth; and on the fifth was extinct. In the same experiment, with sulphat of soda, the effect was less, but it was greater with sea-water. Similar appearances took place by a similar treatment of the mackarel.

He next suspended in a room the herring and the mackarel. On the second night the skinny side became luminous; on the third night both fish of the whole were exceedingly luminous. Dr. Hulme observes, that he lost roe of both these fish afforded the most light. At the time these fish became very luminous, Dr. Hulme scraped off some of the luminous matter, which he named herring's light, or mackarel light. This substance he introduced to different solutions of salts.

The solutions used were sulphats of magnesia and soda; muriat and phosphat of soda; nitrat of potash; Rochelle salt; tartar of soda; and sea-water. He also used solutions of honey and sugar: the quantity of water in each was two ounces; the quantity of each substance dissolved in the same was two drachms, with the exception of the nitre, and muriat of soda, the former being half a drachm, and the latter a drachm.

The herring or mackarel light being introduced to the solution of sulphat of magnesia, rendered the whole mass of liquid very luminous, and continued for 24 hours. All the above solutions became luminous by adding the same lucid matter. The phosphat and muriat of soda appear to have been better than the rest. The light with sea-water was more permanent, being luminous for several days. After the above luminous matter had ceased to shine, the light was in some degree revived by motion. What is very remarkable in these experiments, is the circumstance, that when the solutions were made stronger to a certain extent, the light became suddenly extinguished, but was always restored by dilution with water.

The light is also extinguished by water, lime-water, water impregnated with carbonic acid, or with sulphuretted hydrogen, alcohol, alkalies, and acids.

In all the above experiments the light is not attended with the least elevation of temperature.

By exposing this luminous matter to a certain degree of cold the light is extinguished; but is restored with the return of temperature. A moderate heat causes it to be more bright; but the heat of boiling water entirely extinguishes it, and destroys the property. According to another set of experiments by Dr. Hulme, in the Phil. Trans. for 1801, page 483, it appears, that these substances do not shine brighter in oxygen than atmospheric air. In nitrogen gas

they do not begin to shine; although, after the shining has commenced, they continue to shine in this gas for a limited time: the presence of oxygen appears to be essential in first producing this property. Dr. Hulme found, that when two herrings were exposed, with their sides touching, the unexposed parts remained dark: he found the effect produced by covering any part with strong brown paper.

In hydrogen gas the fresh fish begins to shine; and, if begun, it is very soon extinguished: it recovers its property, however, by re-exposure to the air of the atmosphere. By repeated and alternate exposure to these gases, the light is lost and regained a number of times. This light is also extinguished by nitrous, carbonic acid, and sulphuretted hydrogen gases. This phosphorescence is extinguished in vacuo; but is restored by letting in the air. The glow-worm and rotten wood were found to possess similar properties: they were similarly acted upon by the different gases, by cold, and by moderate heat. The light of the shining matter from the fish was extinguished by a heat from 96 to 100 of Fahrenheit: the temperature of 110° impaired, but did not extinguish the rotten wood: the temperature of 114° increased the brilliancy of the glow-worm; but the temperature of 212° extinguished both.

It appears that rotten wood, like the fish, does not give out light till it has been exposed for some time to the air: it retains its luminous property immersed in spring-water, or distilled-water, and also in linseed oil; it is, however, extinguished by acids, by alcohol, and, perhaps, by alkalies. The luminous matter of the glow-worm is a liquid secreted and retained in the lower part of the abdomen. If the fluid be squeezed out, it still retains its shining property, and may be spread upon the palm of the hand; but it soon in this state disappears.

This property is observed in some other insects, particularly the lantern-fly of the West Indies.

The light of a great number of these artificial and natural pyrophori does not appear to depend in the least upon the presence of oxygen. Of this kind are phosphorus of Canton, the different earthy salts which shine by the application of heat, and some other minerals which shine by friction and attrition. Those of which we have last treated require the presence of oxygen, at least to acquire the property of shining. This circumstance renders the supposition of Dr. Hulme rather improbable, namely, that the light is a component part of the body from which it is illuminated. The only thing which the facts above given can be allowed to have established, is that, during a certain state of the animal substance, between death and actual putrefaction, some process is carried on in the presence of oxygen, by which light is evolved; and that during the time the substance is in vacuo, or in some gas which is destitute of oxygen, this process is suspended, and by the presence of other substances totally stopped. The fact of its continuing to shine in nitrogen, might arise from the presence of a small portion of oxygen. It appears, from the circumstance of its shining in atmospheric air, as much as in oxygen, that very little oxygen is necessary. Forster asserts that the glow-worm shines brighter in oxygen, but the oxygen does not appear perceptibly impaired. This shews, that although oxygen is necessary, the quantity required is very small.

It has been too common for chemists to draw the following conclusion, that when light, or light and heat together, are evolved, that it must either have arisen from combustion, or that the light is a component part of the body from which it is disengaged. As, for instance, because Canton's phosphorus shines without the presence of oxygen, the

the light is called light of combination; and Dr. Hulme has, with less foundation, drawn the same conclusion. Instead of saying that light and heat are products of combination, from the union of oxygen with inflammable matter, we should say that it is the result of rapid chemical combination, when the bodies have great affinity for each other.

We have several facts which confirm this idea. When strong mineral acids combine with pure potash, lime, or magnesia, much heat and some light are emitted. The same thing is also observed in slacking of lime. In an experiment, made by a society of chemists, it appears, that when a mixture of sulphur and copper filings is exposed to a red heat, in a glass tube, the oxygen being excluded, the two substances suddenly combine, attended with the disengagement of light. In those chemical changes where heat and light are disengaged, the following law will obtain. The change of temperature will be as the difference between the specific heat of the compound body, and half the sum of the specific heat of the bodies before combination; while the intensity of the light and heat will be inversely as the time in which this change has been taking place.

We shall here leave the subject of phosphorescent light, to give some account of that produced by combustion; in treating which, we shall find our progress much facilitated, by considering combustion as dependent on the above law, rather than upon the laws of combustion, as laid down by Lavoisier, who was of opinion, that the light and heat furnished by combustion were entirely derived from the oxygen. If, as we have supposed, the quantity of heat be greater, as the specific heat of the resulting compound is less than the mean of the bodies before combination, we ought to have heat evolved whenever such change can be proved; and by ascertaining, before hand, the specific heat of the compound, and of the elements, the quantity of heat may be known. Experience has already given great strength to this notion. The intensity of the light and heat, however, during these changes, will not depend upon the absolute quantity evolved, but upon the rapidity of the evolution; and, if we are not greatly deceived, the quantity of light will always be as the rapidity of combustion. In the slow combustion of hydrogen gas, the light is not great, but the whole heat is greater than that afforded by any other combustible body. On the other hand, the absolute quantity of heat afforded by the combustion of phosphorus, is much less than that evolved by burning an equal weight of hydrogen; but the quantity of light given by the former, much exceeds that of the latter. The intensity of light, however, will also be inversely as the space which it occupies, and hence it will be as the specific gravity of the combustible body. We may therefore conclude, that the quantity of light afforded by combustion will be as the rapidity of combustion, which will be as the affinity of the body for oxygen, as the density of the burning body, and inversely as the cohesion of the body. The difference of cohesion between charcoal and the diamond accounts for the relative combustibility of these two bodies. For this reason, soft iron wire ought to afford more vivid combustion in oxygen than steel wire.

In order to obtain a relative idea of the value of different combustible bodies, used for procuring artificial light, we shall detail some ingenious experiments made by Dr. Henry, and published in Nicholson's Journal, vol. xi. p. 65.

Dr. Henry, with a view to ascertain the relative value of the combustible gases, made some trials with hydrogen, carburetted hydrogen, and carbonic oxyd. These he found

did not afford a very inferior light, compared with the splendid light given by the gas afforded by the destructive distillation of pit-coal, which is equal to the light given by the finest spermaceti oil. The following table points out the result of his experiments, and clearly shews the cause of the superior property of coal gas to produce light.

Kind of Gas.	Measures of oxygen gas required to saturate one hundred measures of each.	Measures of carbonic acid produced.
Pure hydrogen	50 to 54	None
Gas from moist coal	60	35
Do. Wood (oak)	54	33
Do. dried peat	68	43
Do. from cannel coal	170	100
Do. Lamp oil	190	124
Do. Wax	220	137
Pure olefant gas	284	179

The first column contains the different gases, 100 measures of each being used in each experiment. The second, the measures of oxygen which were consumed, while each of the 100 measures were burning. The third, the quantity in measures of carbonic acid, which resulted from the combustion. It is a fact, already ascertained, that every measure of carbonic acid gas has resulted from a measure of oxygen; consequently, the quantity of oxygen consumed in its formation is equal in measure to the numbers in the third column; the excess of oxygen, therefore, appearing in the second. By subtracting the number in the third from that in the second, it will give the quantity of oxygen which has combined with the hydrogen in each of the gases. This excess of oxygen, in the second column, will combine with two measures of hydrogen, to form water. In order to form some idea of the relative value of these combustible gases, we will compare the first, which is pure hydrogen, and the last, or the pure olefant gas, which has the greatest efficacy in producing light. The 50 measures of oxygen in the first combine with 100 of hydrogen, and since no carbonic acid is produced, this is the whole effect. In the last experiment, 179 of carbonic acid is formed at the expence of 179 measures of oxygen, and about 3ths its weight of carbon, which would alone have furnished considerable light. Since, however, 284 measures of oxygen are expended, we have  $284 - 179 = 105$  measures of oxygen, which would require 200 measures of hydrogen. If, therefore, hydrogen and carbon were equally efficacious as combustible bodies in producing light, the quantity of light in one, to that in the other, would be as  $210 + \frac{1}{3} \times 179 : 100$ , or as 25 to 1 nearly. The ratio of the specific gravities of these gases is as 90 to 8 nearly; therefore, multiplying these ratios, we get 270 to 8, or 34 to 1 nearly, for the relative intensity of the light of each.

These different gases are here supposed by Dr. Henry to be mixtures of several gases, the composition of which is known, and all consisting of different proportions of hydrogen and carbon, with the exception of the carbonic oxyd,

which

which contains oxygen. Now, setting aside the latter gas, which being partly saturated, the rest will be in their effect to produce light, as the quantity of carbon they contain; not that carbon is more effective than hydrogen, but because the specific gravity of the gas is increased by the carbon. Since, therefore, the olefant gas contains the most, and is of the greatest specific gravity in consequence, those gases which contain the greatest quantity of olefant gas, must be the best for producing light by combustion. Now, it may be seen in the table, that the gases obtained from lamp oil and wax are the next to the olefant gas in their effect of giving light; and hence we may conclude that those gases contain a large proportion of olefant gas, and of course seem well fitted for producing artificial light. If we may judge by analogy, we may expect that the spermaceti fat will stand as high as the oil, and the best tallow may, perhaps, be the next in order. During the burning of these substances, the vapour which, when kindled, constitutes the flame, may consist of a great proportion of the olefant gas. In the burning of all fatty substances, however, there is a great redundancy of carbon, which flies off with the gaseous products in the form of smoke, and which is burnt in the Argand lamp. The above facts will furnish an elegant and simple method of appreciating the relative value of the different combustible bodies to produce light. See GAS-LIGHTS, LAMP, and COMBUSTION.

The light which is furnished by combustion, and commonly called artificial light, is considered by most philosophers as being a component part of the bodies employed in the combustion. Even in the simple process of heating a body red-hot, it is said that the body at that temperature begins to give out light. It is rather curious, that all bodies should give out light at the same temperature, which is said to be about 800° Fah. It would appear, from a fact given by the late Mr. Wedgwood, that the emanating medium is heat or light, according to the density of the body from which it is emanated. The heated air is so hot, as to make a thin slip of gold appear red-hot, although the aerial medium did not become luminous. Terrestrial light, as it appears to possess most of the properties of solar light, like it, can be transmitted and refracted by transparent bodies, and it strictly resembles it in being reflected by the same bodies. It is said, however, to contain a different proportion of the coloured rays from that of solar light, being defective in the blue, and redundant in the red rays.

Doct<sup>r</sup> Herschel has made a number of experiments upon terrestrial light, in order to compare it with the heat furnished by the sun; but he seems to have taken it for granted, that the solar light and the artificial do not differ, although his experiments prove, that terrestrial heat and solar heat differ essentially. Artificial heat does not pass through glass, while the solar calorific rays pass easily through the substance of a prism, and afterwards through a convex lens.

It has been found that artificial light has some chemical properties. The Abbé Tessier found that the green colour of vegetables is produced by the light of a lamp. This fact has been confirmed by Decaudolle.

LIGHT, *for the Properties of reflected*, see REFLECTION, MIRROR, &c.

LIGHT, *for the Properties, &c. of refracted*, see REFRACTION, LENS, &c.

LIGHT, *for the Doctrine of the Colours of*, see COLOUR, REFRACTION, and REFRACTIBILITY.

LIGHT, *for the Manner in which it affects our Senses, and how it contributes to Vision*, see VISION.

LIGHT *from Diamonds and other Bodies*. See LIGHT, *supra*, DIAMOND, ELECTRICITY, and PHOSPHORUS.

LIGHT, *Exhibition of, by living Animals*. This singular property belongs only to creatures of a simple structure. It appears to reside only in certain species of the four last classes as established by modern naturalists, *viz.* mollusca, insects, worms, and zoophytes.

The mollusca and worms contain each but a single species, which has been ascertained to shew light; for the account of certain species of *lepas*, *murex*, and *chama* yielding light, does not seem to rest upon any good authority, and the stories told by Bruguiere and by Plaugergues of earth-worms being luminous, are improbable in themselves, even if they were not contrary to common observation. See Journal d'Histoire Naturelle, tom. ii., and Journal de Physique, tom. xvi.

The examples of luminous species are more numerous amongst insects than in any other class. They are to be found in the following genera; *elater*, *lampyrus*, *fulgora*, *pausanus*, *scelopendra*, *cancer*, *lyncus*, and *limulus*.

There are also many luminous zoophytes, particularly in the genus *Medusa*, and in the new genus *Beroe*.

Some writers have attributed the property of shining while alive to certain fishes; but, as it would appear, upon very questionable grounds. In a voyage from France to Cayenne, Mr. Bajon saw in the sea a number of luminous points which shone when struck, and another appearance of pale flames, about three feet below the surface of the water. He likewise observed in the migration of the *dorado* and other fishes, that their bodies were studded with similar luminous points. Upon examination he discovered those to be minute spheres which adhered to the surface of the fish. These were most probably the small species of luminous *medusa*. We shall hereafter notice that Bajon's observations therefore shewed no property of shining in the fish themselves.

Godehen de Riville states in a paper he sent to the Academy of Sciences, that he found in the *Scomber pelamis*, on opening it alive, an oil which was extremely luminous. It should be observed, that Riville was prepossessed with the opinion of all the luminous appearances of the sea being occasioned by a peculiar oily fluid; other parts of his Memoir shew inaccuracy of information; and it may be added, that if the oil of fishes were usually luminous, as supposed by Riville, it would be a fact very generally known.

We shall now proceed to consider the luminous property in those animals which have been ascertained to possess it. Afterwards we shall describe the peculiar organs from which the light is known in certain species to emanate; and lastly, we shall examine the opinions that have been entertained respecting the nature and origin of animal light.

The species of *Pholas*, described by Pliny under the name of *Dactylus*, has long been known to possess remarkable powers of evolving light. It is recorded by Pliny, that every part of this animal's substance is charged with a fluid, which, like liquid phosphorus, renders any object luminous with which it comes into contact.

Reaumur has confirmed the observations of Pliny; he found also that the water contained in the shell of the *dactylus*, and other fluids in which the animal might be immersed, acquired the property of shining, and after touching the creature, the hands communicated to common water a milky or pale phosphoric appearance. Reaumur observed that the light was most vivid when the *dactylus* was fresh; it afterwards gradually declined until it became extinct. He dried the entire animal, which deprived it of all power of shining, but this was restored in a weaker degree even after four or five days, by moistening it either with fresh or salt water. So far from the process of dissolution being at

all necessary to the luminous appearance of the *daæylus*, Reaumur found that it was destroyed by putting putrid individuals amongst those which had been recently taken. Mem. de l'Acad. des Sc. de Paris, 1712.

There are three luminous species of *elater*; the *noctilucus*, *phosphoreus*, and *ignitus*. The first of these shines so brilliantly, that before the arrival of the Spaniards in South America, it is said many tribes of Indians used no other light for transacting their ordinary business; and at present the women wear the insect at night as an ornament in their head-dresses. Dr. Patrick Brown, in his History of Jamaica, says, the *elater noctilucus* is seldom met with during the day, it being then torpid; it flies by night, at which time it emits an unsteady light, having alternate moments of darkness. He observed, also, that the extinction of the light depended upon the will of the animal.

It is well known, that in the *elaters* the light proceeds from the smooth yellow spots situated upon the corcelet; but Dr. Brown seems to think that all the internal substance is equally luminous, and that the yellow spots appear so in a greater degree than the other parts, in consequence of the transparency of the shell at these places favouring the transmission of the light. He says, in forcing the rings that cover the different parts of the body a little asunder, you may observe the same light to issue from all the entrails indiscriminately. The internal parts of insects are so transparent, and would permit so much light to pass through them from the proper organs, that Brown might readily have taken up the above opinion without its being well founded. Thus we have observed, on opening the *glow-worm* at the back in the dark, that the light shone through all the intestinal parts.

There is some obscurity in the accounts of naturalists with respect to the *elater phosphoreus*. Deeger distinguishes it from the *noctilucus*, on account of the yellow spots being visible on both the upper and lower sides of the corcelet; but we have found that this is to be observed in the latter species also. The principal, and perhaps the only real distinction of the *phosphoreus*, is its smaller size than the *noctilucus*.

The *elater ignitus* of Fabricius is considerably smaller than the preceding species, and is sufficiently characterised by having the margins of the corcelet yellow, in place of the two yellow spots.

The genus *Lampyris* contains many species which emit light; of these we may mention the *L. noctiluca*, or common *glow-worm*; *L. splendulida*, which Deeger considers the *noctiluca* as a variety; the *L. ignita*, *L. phosphorea*, *L. nitidula*, *L. lucida*, *L. italica*, *L. japonica*, and *L. pennsylvanica*, which last appears to be the *Pyralis minor* of Brown. Probably other species of *lampyris* might be enumerated amongst those that have the property of shining; but as the light of all the *lampyrides* appears to be produced nearly in the same manner, it is not so necessary to our purpose, to fix with precision the number of the luminous species.

The *lampyrides*, like the *elaters*, have the power of regulating at pleasure the degree of their light, or of suspending it altogether. The colour of the light depends upon its strength; when very weak it is of a faint emerald colour, and in its most vivid state it is a bright yellow or orange colour.

The *glow-worms* of this country are only luminous in the season for procreation, which lasts during the summer months; when the females are impregnated, and have deposited their eggs, they shine no longer. This circumstance has authorised the common opinion, that the exhibition of light is made for the purpose of guiding or inviting the male insect.

The *glow-worms* most frequently assemble in numbers upon dry banks, or under hedges on the sides of unfrequented roads; they are rarely seen on public roads or in fields. They do not display their light upon all nights alike; scarcely one of them will be seen for several nights together, and then, as it were by common consent, they appear with great splendour for a few nights, after which they again retire. Their disappearance probably depends upon their meeting with the male insect, for we have not observed that the state of the weather has any influence upon them. They commonly begin to shine before it is quite dark, and extinguish their light some time before the approach of day. It is remarkable with what regularity their instinct guides them in this particular; we have kept them the whole day in darkness, without their shewing any desire to move or expose their light, yet in the evening, although purposely placed near burning candles, they crawled about and shone with brilliancy.

The light of the glow-worm is always most vivid when the creature is in motion; it may also be excited or increased by turning the insect on its back, or otherwise teasing it. But the luminous appearance is interrupted at all times by short and irregular periods of either diminished light or total darkness; usually, however, there are two small spots on the last ring of the abdomen, which retain their light whilst the other luminous rings cease to shine.

The *lampyris italica* has been observed, like the *noctiluca*, to have the power of modifying its light; it is, however, rendered more brilliant at each motion of its wings. Mem. de l'Acad. des Sc. 1766.

The *pyralis minor* of Brown exhibits a vacillating light; sometimes stronger, sometimes weaker, and at times dying wholly away. The light is always renewed in a few seconds, the obscure intervals being of shorter continuance than the moments of illumination, which the creature seems able to command at pleasure. Every part of the abdomen appears to yield light in this insect, which is stronger and more constant than what is emitted by the *elater noctilucus*. Brown's History of Jamaica.

It has been asserted, that the larva and chrysalis of the *lampyrides* are luminous. Deeger mentions, that the larva of the *lampyris italica* has been mistaken by Linnæus for the perfect female insect.

M. Gueneau de Montbiellard not only states the larva and chrysalis of the glow-worm to be phosphorescent, but that the eggs also for two, three, five, or more days after they are expelled from the female, emit light without intermission or decrease, and that for an equal time their light declines until it becomes extinct. He observes, that it is not necessary for the eggs to be fecundated, but that those which shone longest produced the larvæ. In one instance he did not find the eggs to be luminous; on another occasion, some eggs, which were laid on the 12th of June, showed a degree of light, even on the 28th of July. Memoire sur la Lampyre. Acad. de Dijon.

We have very frequently had great numbers of the eggs of the glow-worm in our possession, but we never saw them in a luminous state, except upon one occasion, when they shone unremittingly for several days together, as described by Montbiellard; the fact is, therefore, the more remarkable, on account of the rarity of its occurrence.

Besides the species of *fulgora*, in which the luminous faculty has been noticed, there are probably several others, if we may judge by analogy of structure, that also possess it. The individuals most distinguished for this property, are the *lanternaria*, *candelaria*, and *pyrorhynchus*.

The *fulgora lanternaria* displays a very brilliant sparkling light,

light, which is only seen during the night when the insect is in motion. Madam Merian having once collected a number of this species, she enclosed them in a box, without being aware of their luminous property. Being one night attracted by the noise that proceeded from the box, she opened it, and to her great surprize, found every insect in motion, and yielding a strong light. Merian Surin.

Cuvier seems to entertain some doubts of the luminous property of the *lanternaria*. He says, in his Tableau Elémentaire de l'Histoire Naturelle, some voyageurs have asserted, that the projection from the head of the insect emits a vivid light, but it appears, at least, that this does not exist at all times.

The *fulgora candelaria* has been observed to throw out flashes of light, which are succeeded by moments of obscurity.

The *fulgora pyrrhynchus* has been reported to shed a radiant light.

With respect to the luminous property of the other *fulgora*, we are not in possession of any particulars.

The *pausis spherocerus* has been discovered to yield light by Dr. Atzelius. On going to look at his specimen one evening, he says, he happened to stand between the light and the box in which it was contained, so that his shadow fell upon the insect; he observed, to his great astonishment, the globes of the antennæ, like two lanterns, spreading a dim phosphoric light. He examined the insect several times during that night, when the same appearance still presented itself; he was, however, disappointed in not having the opportunity of making further observations upon the animal, as it was so much exhausted it died before morning, and he was not able to procure another specimen. Linnæan Transactions, vol. iv.

The *scelopendra electrica* is an insect frequently found in this country, but is not observed to be luminous at all times. Degeer said he never saw it emit light, which was probably owing to the animal being only luminous under particular circumstances. It would appear that this species is incapable of shining unless after exposure to solar light. In several experiments that were made upon the *scelopendra electrica*, it was found, that the creature could not be excited to shine after it had remained all day in a dark situation, but a short exposure to the light appeared to be sufficient to restore the luminous property.

The light produced by the *scelopendra electrica* has a dull phosphoric appearance; it is a momentary emanation, which only takes place when the creature is disturbed or pressed.

The *scelopendra phosphorea* is but imperfectly known; in the edition of the *Sytlema Naturæ*, published in 1767, Linnæus states, that this insect is an inhabitant of Asia; that it yields, during the night, a light resembling that of the *glow-worm*, and that it is caught by falling from the sky on ships in the Indian and Æthiopian seas, 100 miles from the continent. Linnæus quotes as his authority, Car. Guell. Ekeberg, who, he says, saw, described, and delineated the animal.

Ekeberg was a Swede, and the captain of an East India-man. He made fourteen voyages, but, as far as we can learn, never published his discovery of the *scelopendra phosphorea*, and as we have no subsequent accounts of this insect by other voyagers, its real characters, and perhaps existence, must remain doubtful.

The *cancer sulgens* was discovered by sir Joseph Banks, during his first voyage with captain Cook, in the passage from Madeira to Rio de Janeiro. He observed, that its whole body was illuminated, and produced very vivid flashes of light. Phil. Trans. 1810, part ii.

Hablitzl relates, that a cable being on one occasion drawn up from the sea, it was found to exhibit light, and, upon closer inspection, it was perceived to be covered with the *cancer pulex*. Hablitzl ap. Pall. n. nord. Beytr. 4. p. 396.

Thules and Bernard, of the academy of Versailles, also reported, that they met with the *cancer pulex* entirely luminous.

In different systems of natural history, the property of shining is attributed to this species of cancer, probably only on the above authorities. The accuracy of the assertion might perhaps be still called in question, as the *cancer pulex* being frequently under our eyes, its luminous property, if it existed, could hardly escape more general observation.

In 1754, Godeheu de Riville discovered a luminous testaceous insect on the coast of Malabar, which appears to belong to that division of the Linnæan genus, *monoculus*, called by Muller *lyncus*.

Riville, perceiving the sea around his ship to emit a very brilliant light, procured some of the water and strained it; after which it ceased to shine, but the cloth was covered with luminous specks, that resembled in form and magnitude the ova of fish; on being examined in the light, with a magnifying glass, they were discovered to have an internal motion; some that were set at liberty in the water were seen to swim with great rapidity like water fleas. Riville seized one of these with a pair of forceps, which caused it to shed a luminous liquor of a blue colour, that illuminated the water to the distance of two or three lines.

Some of these animals were put into fresh water, which they survived only a few seconds, and descended, struggling, to the bottom of the vessel; many of them rendered much luminous fluid while dying.

Riville describes this creature as being enclosed in a shell resembling an almond, split along the side, and notched at the upper end, which is so transparent that all the internal parts are seen through it. The insect has four jointed antennæ, furnished at their extremities with long setæ. There are two feet armed with hooks; and below these, a thick foot terminating in several claws. The viscera are contained in a round sac; and at the lower part of the shell there is found a number of azure-coloured globules, which Riville considered as reservoirs of the luminous fluid, because they became of a dull yellow colour when the animal was about to die; but they are more probably the ova, which are also visible in this situation in other testaceous insects.

The luminous liquor shed by the animal does not, Riville says, mix with water, but floats on the surface like globules of oil. By straining some water from which the animals had been removed, similar globules were left in a distinct form upon the cloth. From these circumstances, he was disposed to believe that the globules he saw were really of an oily nature: which opinion he was in a great measure induced to adopt, from a preconceived theory, that all the luminous appearances of animals depend upon the occasional presence of an oily fluid. *Memoire sur la Mer lumineuse*. Mem. Etrang. de l'Acad. des Sciences, tom. iii.

A few years ago, captain Horsburg presented sir Joseph Banks with some notes on the luminous appearance of the sea, and a drawing of a phosphorescent marine insect, which have been published in a paper of Mr. Macarty's communicated to the Royal Society in 1810.

Captain Horsburg remarks, that the luminous state of the sea between the tropics is generally accompanied with the appearance of a great number of marine animals, of various kinds, upon the surface of the water; to many of which he does not, however, attribute the property of shining.

shining. At other times, when the water which gave out light was examined, it appeared only to contain small particles of a dusky straw colour, which dissolved under the slightest touch of the finger.

Captain Horsburg likewise observes, that in Bombay, during the hot weather in the months of May and June, he has frequently seen the edges of the sea much illuminated by minute sparkling points. These, whilst in the water, always avoided seizure, by moving away from the hand, so that it was with difficulty he procured any of them. Upon two occasions, he succeeded in detecting the animals that caused the light of the sea. At sun-rise, on April 12th, 1798, in the Arabian sea, he perceived several luminous spots in the water, which conceiving to be animals, he went in the boat, and with some difficulty caught one. This insect, he says, resembled the wood-loose in appearance, and was about one-third of an inch in length. When viewed with the microscope, it seemed to be formed by sections of a thin crustaceous nature. During the time any fluid remained in the animal, it shone brilliantly like the fire-fly.

In the month of June of the same year, he picked up an insect on a sandy beach, which gave light. This was also covered with a thin shell, but was of a different shape and a larger size than the animal taken in the Arabian sea.

Mr. Macartney entertains no doubt that both these insects were monoculi. The first he refers to the genus *Limulus* of Müller, and gives it the specific name of *Nœtilucus*. See Phil. Transact. 1810, part ii.

The light of the sea has been most frequently ascribed to the presence of a minute species of worm, the *nercis noëtiluca* of Linnæus, even by those who did not pretend to have seen the animal.

This creature was first described under the name of *Luciola marina*, in a small pamphlet published by Dr. Vianelli at Venice, in 1749. He found about thirty of them on the leaf of an alga, taken up from the lake of Chioggia. By shaking the leaf, he succeeded in procuring one of these on a piece of white paper. To the naked eye it appeared, in form and magnitude, like the half of the hair of the eye-lid. It had a yellow colour, and was formed of very tender substance. When it was examined under the microscope, he discovered that it had the figure of a worm, and consisted of joints or segments. It had two antennæ; a number of setaceous processes along each side of the body, which he considered as fins; and under these, other twisted processes analogous to feet. *Nuove Scoperte Intorno le Luci notturne dell' Acqua marina fatte da Guseppee Vianelli.*

Vianelli's observations were repeated soon after by Griseolini. He procured some of these animals upon the seaweed, on which they are usually found; and having placed one of them in some water, between two concave glasses, he subjected it to microscopic examination with the highest magnifying powers: by which means, all the parts of the worm were very evident. He describes the head as having two short antennæ, and a horn-shaped process between these, and two dark coloured eyes. The lateral processes, he says, form transparent cases, which terminate in a denticulated manner, and contain each a tuft of hair. The other processes are also transparent, extensile, and sometimes entwined together.

He observed that the light is shed at all seasons, but is most striking and most frequently seen in summer. When the wind is about to change from the S. E. into the E., the light is increased; and in the dark winter nights which succeed a warm sun, the luminous appearance is produced as in summer.

Griseolini further mentions the shining of another marine insect, which appears to be the *monoculus* discovered by Riville. Observations de François Griseolini sur la Scolopendre marine luisante, Venise 1750.

The same animal has likewise been described and figured by Adier, under the name of the *nercis phosphorans*. His description coincides with that of Griseolini. He states that this species is found in the African and Indian oceans, but that it is rarely met with in the Northern seas. *Annotates Academicæ Carol. Linne.*

The *nercis noëtiluca* was seen by the abbé Nolle, M. Rigaud, and Fougereux de Bondaroy. The latter, however, describes it to be the size of the head of a small pin. He says it increases, diminishes, or extinguishes its light at pleasure, which commonly issues from the posterior part of the body; but when fully illuminated, the head only is opaque. The colour of the light is blueish. When squeezed, it sheds a train of luminous fluid; which appearance is also seen, in a degree, when it is agitated in the water. He mentions having observed two sizes of the animal, but cannot determine whether these are different ages, sexes, or species. *Mem. de l'Acad. des Scien. 1767.*

The abbé Diquequere states, that he saw the luminous animals discovered by Vianelli; that he exhibited them to his pupils during his lectures, and delineated them at the same time. These drawings he sent to Rigaud, who returned for answer, that the designs were precisely the same of those which he had himself executed. *Journal de Physique, tom. vi.*

Spallanzani also asserted that he had seen the *nercis noëtiluca*.

After such a striking concurrence of testimony, we cannot presume to doubt the existence of this species of luminous animal: but we are led to think that it never visits the coasts of this country; as in numerous examinations we have made of sea-water in a luminous state, we have not met with it. Judging from our own experience, and comparing it with the observations of others, we are led to conclude that the *nercis noëtiluca* is, generally speaking, a rare species, and that the light of the sea is most frequently occasioned by *medusa*.

The largest and most splendid of the luminous *medusa* is the *pellucens*, which was discovered by Sir Joseph Banks, in the first voyage of captain Cook. It was taken up from the sea, at the same time with the *cancer fulgens* already mentioned, in the passage from Madeira to Rio de Janeiro. This species measures six inches across the crown or umbella, which is marked by a number of opaque lines that pass off from the centre to the circumference. The edge of the umbella is divided into a number of lobules, which succeed each other, one large and two small ones alternately. From within the margin of the umbella there is suspended a number of long cord-shaped tentacula. The central part of the animal is opaque, and furnishes four thick irregularly shaped processes, which hang down in the midst of the tentacula.

The *medusa pellucens* throws out flashes of light during its contractions, which are so vivid as to affect the sight of the beholders. When the water in which these animals, and some of the *cancer fulgens*, were contained, was emptied out of a bucket, it appeared like a stream of fire, or fused gold. *Phil. Trans. 1810, part ii.*

The *medusa noëtiluca* is described by Forstæl, as measuring about three inches in diameter, and about one and a half inch in depth. Its surface is convex, of a reddish glab colour, with brown spots. The margin is notched into 16 lobules.

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The central part, containing the vilcra, hangs down for some way, and is surrounded by eight somewhat broad tentacula. Forskal, *Descriptiones Animalium*.

This species is reported to be extremely luminous, particularly round the margin.

Forskal has described also a species of luminous animal under the name of *medusa densa*. It appears to be a beroc, and corresponds most nearly with the *medusa pileus* of Gmelin.

A luminous species of *medusa* was discovered by Spallanzani in the strait of Messina. Its form is convex, with a fibrated margin. There are four thick tentacula, and eight which are long and slender. These are each hollow. In the concavity of the umbella there are four small groups of long thin bodies, entwined together like intestines, and adhering to an entangled mass of small tubes of a silver colour, that are extremely transparent and elastic. At the internal edge of the cavity of the umbella there is a thin muscular lamina. The pulse communicates with four lateral orifices, and has an aperture besides. Spallanzani represents this species as being exceedingly luminous. He says it shines like a torch, and is visible 35 feet below the surface of the water. The light is variable; sometimes it continues for a quarter or half an hour, or longer; at others it becomes suddenly extinct, and re-appears after a considerable interval. He supposes that the cessation of the light depends upon the animal being at perfect rest. *Memoria sopra le meduse fosforiche*. Mem. della Soc. Ital. tomo vii. and Spallanzani's Travels in the Two Sicilies.

Spallanzani further states, that he discovered in that part of the sea next the eastern coast of Genoa, in addition to the nereis nothilica, five other species of *sea glow-worms*, as he calls them, two of which he met with again in returning from Messina to Lipari. He proposed to give a description of these animals in his Voyage to Constantinople, which book, as far as we can learn, was never published. We must, however, confess, that Spallanzani's known fondness for the wonderful, would lead us to receive these discoveries with some degree of distrust, particularly as they have not been confirmed by the observations of others.

One of the most brilliant of the whole tribe of luminous creatures has been lately discovered by Mr. Peron in the Atlantic ocean. Most naturalists would, from the general appearance and structure of the animal, consider it as a species of *beroc*, but Peron has created a new genus, of which this is the only species yet discovered, and which he calls the *Pyrosoma atlanticum*. The animal has an elongated and nearly cylindrical figure, truncated at one extremity, and rather conical at the other. The body is hollow, and does not contain any organ, except a very delicate net-work of vessels, which is spread over the internal surface of the cavity. The circular aperture, or mouth, is surrounded internally by a number of tubercles. The external surface is studded with some thick elongated tubercles, and others of a smaller size. They are the principal seat of the light, and shine like polished diamonds. The interior of the substance of the body contains a number of small elongated glands, which are also more luminous than the transparent part.

The colour of this animal when at rest, or after death, is an opalesc yellow mixed with a disagreeable green; but during the contractions of its body, the creature appears, as it were, to kindle, and becomes instantly of the red colour of fused iron; it afterwards passes through different tints, as aurora, orange, green, and azure blue, according to the strength of its illumination.

The *pyrosoma*, when at the same depth in the sea, gives the appearance of a red-hot bullet, but when floating on the

surface of the waves, resembles a cylinder of incandescent iron. It was observed to perform regular and alternate motions of contraction and dilatation. The light is evolved during the contractile motions, and these may be excited irregularly, by touching the animal, or merely by agitating the water in which it is contained. The *pyrosoma*, like all the other luminous marine animals, exhibits no light after death.

Mr. Peron only met with this species in a certain latitude, and observes that the mollusca and zoophytes, which are found at great depths in the sea, or at great distances from any shore, always inhabit particular regions of the ocean, out of which they are very rarely met with. *Annales du Museum d'Histoire Naturelle*. Mem. par Peron. 24 Cahier.

The *penatula phosphorea* is well known to exhibit light, which, Dr. Shaw states in his History of Algiers, is so strong, that it directs the fishermen in their occupation.

The luminous effect is confined to the plumule of the *penatula*, or that part which is inhabited by the polyps. Spallanzani, in a letter to Bonnet, states that the light is only emitted when the *sea pin* is in motion, and that there is a mucous luminous substance furnished by the polyps, which is soluble in water, and becomes mixed with the sea-water, that is admitted into the pin by means of a hole situated at the extremity of its stalk. (Mem. Soc. Ital. tomo ii.) Other species of *penatula* are said to be luminous, particularly the *grisea*, *argentea*, and *grandis*. The light exhibited by the last is reported to be an ash colour.

In a paper upon luminous animals communicated by Mr. Macartney to the Royal Society in 1810, he gives an account of three species he discovered on our own coasts. One is a *beroc* not described by authors. Another agrees so nearly with the *medusa hemispherica*, that he conceives it to be the same, or at least a variety of it. The third is a minute species of *medusa*, which he believes to be the luminous animal so often seen by navigators, although it has never been distinctly examined or described.

Mr. Macartney first met with these animals in the month of October 1804, at Herne bay, a small watering place upon the northern coast of Kent. Having observed the sea to be extremely luminous for several nights, he had a considerable quantity of the water taken up. When perfectly at rest, no light was emitted, but on the slightest agitation of the vessel in which the water was contained, a brilliant scintillation was perceived, particularly towards the surface; and when the vessel was suddenly struck, a flash of light issued from the top of the water, in consequence of so many points shining at the same moment. When any of these sparkling points were removed from the water, they no longer yielded any light. They were so transparent, that in the air they appeared like globules of water. They were more minute than the head of the smallest pin. Upon the slightest touch, they broke and vanished from the light. Having strained a quantity of the luminous water, a great number of these transparent corpuscles were obtained upon the cloth, and the water which had been strained, did not afterwards exhibit the least light. He then put some sea-water that had been rendered particularly clear, by repeated filtrations, into a large glass, and having floated in it a fine cloth, on which he had previously collected a number of luminous points, several of them were liberated, and became distinctly visible in their natural element, by placing the glass before a piece of dark coloured paper. They were observed to have a tendency to come to the surface of the water, and after the glass was set by for some time, they were found congregated together, and when thus collected in a body, they had a dusky

draw colour, although individually they were so transparent, as to be perfectly invisible, except under particular circumstances. Their substance was indeed so extremely tender and delicate, that they did not become opaque in distilled vinegar or alcohol, until immerfed in these liquors for a considerable time.

On examining these minute globules with the microscope, he found that they were not quite perfect spheres, but had an irregular depression on one side, which was formed of an opaque substance, that projected a little way inwards, producing such an appearance as would arise from tying the neck of a round bag, and turning it into the body.

The motions of these creatures in the water were slow and graceful, and not accompanied by any visible contraction of their bodies. After death they always subsided to the bottom of the vessel.

From the sparkling light afforded by this species, he has given it the name of *medusa scintillans*.

The night following that, on which he discovered the preceding animal, he caught the two other luminous species. One of these he has called *beroe fulgens*.

This most elegant creature is of a colour changing between purple, violet, and pale blue; the body is truncated before, and pointed behind; but the form is difficult to assign, as it is varied by partial contractions, at the animal's pleasure. He has represented the two extremes of form that this creature assumes: the first is somewhat that of a cucumber, which, as being the one it takes when at rest, should perhaps be considered as its proper shape: the other resembles a pear, and is the figure it has in the most contracted state. The body is hollow, or forms internally an infundibular cavity, which has a wide opening before, and appears also to have a small aperture, posteriorly through which it discharges its excrement. The posterior two-thirds of the body are ornamented with eight longitudinal ciliated ribs, the processes of which are kept in such a rapid rotatory motion, while the animal is swimming, that they appear like the continual passage of a fluid along the ribs. The ciliated ribs have been described by professor Mitchell, as arteries, in a luminous *beroe*, which probably was no other than the species we are now speaking of.

When the *beroe fulgens* swam gently near the surface of the water, its whole body became occasionally illuminated in a slight degree; during its contractions, a stronger light issued from the ribs, and when a sudden shock was communicated to the water, in which several of these animals were placed, a vivid flash was thrown out. When the body was broken, the fragments continued luminous for some seconds, and being rubbed on the hand, left a light like that of phosphorus; this however, as well as every other mode of emitting light, ceased after the death of the animal.

The *hemispherical species of medusa* had a very faint purple colour. The largest individuals measured about three quarters of an inch in diameter. The margin of the umbrella was undivided, and surrounded internally by a row of pale brown spots, and numerous small twisted tentacula: four opaque lines crossed in an arched manner from the circumference, towards the centre of the animal; an opaque irregular-shaped process hung down from the middle of the umbrella; when this part was examined with a lens of high powers, it was discovered to be inclosed in a sheath in which it moved, and that the extremity of the process was divided into four tentacula, covered with little cups or suckers, like those on the tentacula of the cuttle fish.

This species of *medusa* bears a striking resemblance to the figures of the *medusa hemispherica*, published by Gronovius and Muller; indeed it differs as little from these figures, as

they do from each other. Its luminous property, however, was not observed by these naturalists, which is the more extraordinary, as Muller examined it at night, and says it is so transparent, that it can only be seen with the light of a lamp. If it should be still considered as a distinct species, or as a variety of the *hemispherica*, Mr. Macartney proposes to call it the *medusa lucida*.

In this species, the central part and the spot round the margin, are commonly seen to shine on lifting the animal out of the water into the air, presenting the appearance of an illuminated wheel, and when it is exposed to the usual percussion of the water, the transparent parts of its body are alone luminous.

In the month of September 1805, Mr. Macartney had again frequent opportunities of witnessing the luminous appearance of the sea at Herne bay, and of making observations upon the animals which occasion it. He found that they always retreated from the surface of the water, as soon as the moon rose, and that exposure to the day light took away their property of shining, which was revived by placing them for some time in a dark situation.

In that season he had two opportunities of seeing an extended illumination of the sea, produced by the above animals. The first night he saw this singular phenomenon was extremely dark, many of the *medusa scintillans*, and *medusa hemispherica* had been observed at low water, but on the return of the tide they had suddenly disappeared. On looking towards the sea, he was astonished to perceive a flash of light, about six yards broad, extend from the shore, for apparently the distance of a mile and a half along the surface of the water. The second time that he saw this sort of light proceed from the sea, it did not take the same form, but was diffused over the surface of the waves next the shore, and was so strong, that he could for the moment distinctly see his servant, who stood at a little distance from him; who also perceived it, and called out to him at the instant. On both these occasions the flash was visible for about four or five seconds, and although he watched for a considerable time, it was not repeated.

A diffused luminous appearance of the sea, in some respects different from this, has been described by several navigators.

Godeheu de Riville saw the sea assume the appearance of a plain of snow on the coast of Malabar. Mem. Etrang. de l'Acad. des Sc. tom. iii.

Captain Newland, in a paper published in the Journal de Physique, states that he has seen the sea appear like milk for a few nights. Cook and Perouse also observed it to be a straw colour.

Father Bourzes, in his voyage to India in 1704, saw what he called luminous vortices in the sea, which he said appeared and disappeared suddenly at certain periods, like flashes of lightning.

Captain Herburg, in the notes he gave to sir Joseph Banks, says there is a peculiar phenomenon sometimes seen within a few degrees distance of the coast of Malabar, during the rainy monsoon, which he had an opportunity of observing. At midnight the weather was cloudy, and the sea was particularly dark, when suddenly it changed to a white flaming colour all around. This bore no resemblance to the sparkling or glowing appearance he had observed on other occasions in seas near the equator, but was a regular white colour, like milk, and did not continue more than ten minutes. A similar phenomenon, he says, is frequently seen in the Banda sea, and is very alarming to those who have never perceived or heard of such an appearance before.

This singular phenomenon appears to be explained by some observations communicated to Mr. Macartney by Mr. Langstaff. In going from New Holland to China, about half an hour after sunset, every person on board was astonished by the milky appearance of the sea: the ship seemed to be surrounded by ice covered with snow. Some of the company supposed they were in soundings, and that a coral bottom gave this curious reflection, but on sounding with 70 fathoms of line no bottom was met with. A bucket of water being hauled up, Mr. Langstaff examined it in the dark, and discovered a great number of globular bodies, each about the size of a pin's head, linked together. The chains thus formed did not exceed three inches in length, and emitted a pale phosphoric light. By introducing his hand into the water, Mr. Langstaff raised upon it several chains of the luminous globules, which were separated by opening the fingers, but readily re-united on being brought again into contact, like globules of quicksilver. The globules were so transparent, that they could not be perceived when the hand was taken into the light.

This extraordinary appearance of the sea was visible for two nights. As soon as the moon exerted her influence, the sea changed to its natural dark colour, and exhibited distinct glittering points, as at other times.

This account of Mr. Langstaff is very important, as it proves that the diffused light of the sea is produced by an assemblage of minute *medusa* on the surface of the water.

In June 1806, at Margate, Mr. Macartney collected a great number of the small *luminous medusa*. A bucket of the water being set by for some time, the animals sought the surface, and kept up a continual sparkling, which was occasioned by the motions of individuals, as the water was perfectly at rest. A small quantity of the luminous water was put into a glass jar, and on standing some time, the *medusa* collected at the top of the jar, and formed a gelatinous mass, one inch and a half thick, and of a reddish or mud colour, leaving the water underneath perfectly clear.

In order to ascertain if these animals would materially alter their size, or assume the figure of any other known species of *medusa*, Mr. Macartney kept them alive for 25 days, by carefully changing the water in which they were placed; during which time, although they appeared as vigorous as when first taken, their form was not in the slightest degree altered, and their size but little increased. This experiment confirmed his opinion of their being a distinct species, as the young *actinia* and *medusa* exhibit the form of the parent in a much shorter period than the above.

In September 1806, he took at Sandgate also a number of the *beroe fulgens*: they were of various dimensions, from the full size down to that of the *medusa scintillans*: they could, however, be clearly distinguished from the latter species by their figure.

In April 1809, Mr. Macartney caught a number of the *beroe fulgens* in the sea at Hastings; they were of various sizes, from about the half of an inch in length, to the bulk of the head of a large pin. Many of them adhered together in the sea; some of the larger sort were covered with small ones, which fell off when the animals were handled, and by a person unaccustomed to observe these creatures, would have been taken for a phosphoric substance. On putting a number of them into a glass, containing clear sea-water, they still shewed a disposition to congregate upon the surface. It was observed that when they adhered together, they shewed no contractile motion in any part of their body, which explains the cause of the pale or white

colour of the diffused light of the ocean. The flashes of light which Mr. Macartney saw come from *tno* sea at Herne bay, were probably produced by a sudden and general effort of the *medusa* to separate from each other, and descend in the water.

The *medusa scintillans* almost constantly exults in the different branches of Milford haven that are called pills. Mr. Macartney sometimes found these animals collected in such vast numbers in those situations, that they bore a considerable proportion to the volume of the water in which they were contained: thus, from a gallon of sea-water in a luminous state, he strained above a pint of the *medusa*. The sea under such circumstances yields more support in swimming, and the water tastes more disagreeably than usual; probably the difference of density, that has been remarked at different times in the water of the sea, may be referred to this cause.

Mr. Macartney concludes that the *medusa scintillans* is the usual cause of the luminous appearance of the sea, not only around this country, but in other latitudes. Besides the places already mentioned, he has found this species on different parts of the coasts of Sussex, at Tenby, and in the bays of Dublin and Carlingford in Ireland. Many writers, he observes, have mistaken this species of *medusa* for the *neris nobiluca*, and some navigators have actually described the *medusa scintillans*, without being aware of its nature. Mr. Bajon, during his voyage from France to Cayenne, collected many luminous points in the sea, which he says, when examined by a lens, were found to be minute spheres. They disappeared in the air. Dr. Le Roy, in sailing from Naples to France, observed the sparkling appearance of the sea which is usually produced by the *medusa scintillans*. By filtering the water, he separated luminous particles from it, which he preserved in spirits of wine: they were, he says, like the head of a pin, and did not at all resemble the *neris nobiluca*, described by Vianelli; their colour approached a yellow-brown, and their substance was extremely tender and fragile. Notwithstanding this striking resemblance to the *medusa scintillans*, Le Roy, in consequence of a preconceived theory, did not suppose what he saw, were animals, but particles of an oily or bituminous nature. Observe sur un lumiere produite par l'Eau de la Mer. Mem. Estrang. des Sc.

The minute globules seen by Mr. Langstaff in the Indian ocean, in all probability, were the scintillating species of *medusa*; on his seeing some of these animals that had been preserved in spirits, he entertained the same opinion.

Professor Mitchell, of New York, found the luminous appearance on the coast of America, to be occasioned by minute animals, that, from his description, plainly belonged to this species of *medusa*, notwithstanding which, he supposed them to be a number of the *neris nobiluca*. Phil. Mag. vol. x. p. 20.

The *luminous animalcule*, discovered by Forster off the Cape of Good Hope, in his voyage round the world, bears so strong a resemblance to the *medusa scintillans*, that there is every reason for believing them the same. He describes his animalcule as being a little gelatinous globule, less than the head of a pin; transparent, but a little brownish in its colour; and of so soft a texture, that it was destroyed by the slightest touch. On being highly magnified, he perceived on one side a depression, in which there was a tube that passed into the body, and communicated with four or five intestinal sacs.

Many writers have ascribed the light of the sea to other causes than luminous animals. Martin supposes it to be occasioned by putrefaction; Silberchlag believed it to be phosphoric;

phosphoric: professor J. Mayer conjectured, that the surface of the sea imbibed light, which it afterwards discharged. Bignon and Gentil thought the light of the sea was electric, because it was excited by friction. Forster conceived that it was sometimes electric, sometimes caused from putrefaction, and at others by the presence of living animals. Fongeroux de Bondary believed that it came sometimes from electric fires, but more frequently from the putrefaction of marine animals and plants.

It is unnecessary to enter into a discussion of the above opinions: their authors have not attempted to support them by any argument or experiments; they merely gave them as speculations. It is sufficient to state, that they are contradicted by all the best observations upon the subject.

The only animals which are known to possess distinct organs for the production of light are, the luminous species of *lampyris*, *elater*, *fulgora*, and *passus*. Of these Mr. Macartney has given the following description.

The light of the *lampyridæ* is known to proceed from some of the last rings of the abdomen, which, when not illuminated, are of a pale yellow colour. Upon the internal surface of these rings, there is spread a layer of a peculiar soft yellow substance, which has been compared to paste, but by examination with a lens, I found it to be organized like the common interstitial substance of the insect's body, except that it is of a closer texture, and a paler yellow colour. This substance does not entirely cover the inner surface of the rings, being more or less deficient along their edges, where it presents an irregular waving outline. I have observed in the glow-worm, that it is absorbed, and its place supplied by common interstitial substance, after the season for giving light is past.

The segments of the abdomen, behind which this peculiar substance is situated, are thin and transparent, in order to expose the internal illumination.

The number of luminous rings varies in different species of *lampyris*, and, as it would seem, at different periods in the same individual.

Besides the luminous substance above described, I have discovered in the common glow-worm, on the inner side of the last abdominal ring, two bodies, which to the naked eye appear more minute than the head of the smallest pin. They are lodged in two slight depressions, formed in the shell of the ring, which is at these points particularly transparent. On examining these bodies under the microscope, I found that they were sacs containing a soft yellow substance, of a more close and homogeneous texture, than that which lines the inner surface of the rings. The membrane forming the sacs appeared to be of two layers, each of which is composed by a transparent silvery fibre, in the same manner as the internal membrane of the respiratory tubes of insects, except that, in this case, the fibre passes in a spiral, instead of a circular direction. This membrane, although so delicately constructed, is so elastic as to preserve its form after the sac is ruptured, and the contents discharged.

The light that proceeds from these sacs is less under the controul of the insect, than that of the luminous substance spread on the rings: it is rarely ever entirely extinguished in the season that the glow-worm gives light, even during the day; and when all the other rings are dark, these sacs often shine brightly.

The circumstance of these being points, which give a more permanent light than the other parts of the luminous rings of the abdomen, has been noticed before by the Comte G. de Razoumoufki. He states the number of these luminous points to vary from two to five. *Mém de la Soc. de Lauenne*, tom. ii.

I must however remark, that I never saw more than two of these luminous points, which were always upon the last ring of the body, and that the figures which accompany the memoir of the Comte de Razoumoufki, bear scarcely any resemblance to the insect they are intended to represent, from which we may fairly suspect him of inaccuracy in other particulars.

As far as my observation has extended, the small sacs of luminous substances are not found in any species of *lampyris*, except the glow-worm of this country. Thunburg mentions that the *lampyris japonica* has two vesicles on the tail, which afford light.

The organs for the production of light in the genus *elater* are situated in the corcelet; these likewise consist of a peculiar yellow substance, placed behind transparent parts of the shell, which suffer the natural colour of this substance to be seen through them in the day, and when illuminated, give passage to the light.

On dissecting the organs of light in the *elater noctilucus*, I found that there is a soft yellow substance, of an oval figure, lodged in the concavity of the yellow spots of the corcelet, which parts are particularly thin and transparent in this species. This substance is so remarkably close in its structure, that at first view it appears like an inorganic mass, but with a lens it is readily perceived to be composed of a great number of very minute parts or lobules closely pressed together. Around these oval masses, the interstitial substance of the corcelet is arranged in a radiated manner, and the portion of the shell that immediately covers the irradiated substance is in a certain degree transparent, but less so than that which lies over the oval masses; it is therefore probable, that the interstitial substance in this situation may be endowed with the property of shining. A fasciculus of the muscles of the corcelet arises in the interior of the oval masses of the luminous substance, but not apparently with any design, as it contributes, with the adjacent fasciculi, to move the anterior feet.

In the *elater ignitus*, the masses of luminous substance are extremely irregular in their figure: they are situated nearly at the posterior angles of the corcelet, and are more loose in their texture than the oval masses of the *noctilucus*, resembling rather, in composition, the interstitial substance which surrounds these masses in that species. The shell of the corcelet is somewhat thinner, and more transparent along both sides of the margin, than at other places, but it is not, as in the *noctilucus*, elevated, and peculiarly clear and thin immediately, over the seat of the luminous organ; consequently, the light emitted by the *elater ignitus* cannot be very brilliant.

I have not been able to procure any specimen of the *elater phosphorea*, but from the accounts of naturalists, it appears to resemble in every respect the *elater noctilucus*.

I have had an opportunity of examining, preserved in a moist way, two species of *fulgora*, the *candelaria* and *lanternaria*. The light in this genus has been observed to issue from the remarkable proboscis on the fore part of the head. This part has always been described by authors as hollow or empty, which I have found to be perfectly correct; and what is more extraordinary, that the cavity communicates freely with the external air, by means of a chink or narrow aperture, placed on each side of the root of the proboscis. This projection is covered internally by a membrane, between which and the horny part or shell, there appears to be interposed a pale reddish coloured soft substance, that is arranged in the *candelaria* in broad lines or stripes; but it is so thin, that I could not distinctly examine its structure, or absolutely determine, whether it should be considered as a substance

ance intended to furnish the light of these insects, or the pigment upon which the colour of the proboscis depends.

The globes of the antennæ constitute the organs of light in the *pauflus spherococcus*. Dr. Azeilius, who discovered the luminous property in this species, compares them to lanterns spreading a dim phosphoric light. (Linn. Transf. vol. iv.) The rarity of the insect put it out of my power to examine its structure, but from the form and situation of its organs of light, it is most probable they are constructed like those of the *fulgoræ*.

It has been conjectured by Carradori and others, that the *lampyrides* were enabled to moderate or extinguish their light, by retracting the luminous substance under a membrane; but neither in them, nor any of the other luminous insects, have I found an apparatus of this sort. The substance furnishing the light, is uniformly applied to corresponding transparent parts of the shell of the insect from whence it is not moved; indeed a membrane, if it did exist, would have but little effect in obscuring the light, and never could serve to extinguish it. The regulation of the kind and degree of the luminous appearance, does not depend upon any visible mechanism, but, like the production of the light itself, is accomplished by some inscrutable change in the luminous matter, which in some animals is a simple operation of organic life, and in others is subject to the will.

It is worthy of remark, that in all the dissections I have made of luminous insects, I did not find that the organs of light were better, or differently supplied with either nerves or air tubes, than the other parts of the body. The power of emitting light likewise exists in many creatures which want nerves, a circumstance strongly marking a difference between animal light and animal electricity. Phil. Transf. 1810, part ii.

With the exception of the animals above-mentioned, the exhibition of light depends upon the presence of a fluid matter.

In the *pholas dactylus*, the luminous fluid is particularly evident, and in vast quantity.

The shining of the *scelopendra electrica* is observed to be accompanied by the appearance of an effusion of a luminous fluid upon the surface of the animal, more particularly about the head, which may be received upon the hand, or other bodies brought into contact with the insect at the moment, and these exhibit a phosphoric light for a few seconds afterwards. This fluid, however, it is impossible to discover in the form of moisture, even upon the clearest glass, although examined immediately with the most scrupulous attention by a lens; it mutt therefore be extremely attenuated.

The same appearance has been observed during the illumination of the *neris noctiluca* by Fougereux de Bondaroy. Mem. de l'Acad. des Sc. 1767.

The animal discovered by Riville shed a blue liquor, which illuminated the water for a distance of two or three lines. Mem. Etrang. de l'Acad. des Sc. tom. iii.

Spallanzani relates, that the *medusa* which he examined, communicated the property of shining to water, milk, and other fluids, on being rubbed or squeezed in them. Spallanzani's Travels in the Two Sicilies, vol. iv.

The luminous fluid is in some instances confined to particular parts of the body, and in others is diffused throughout the whole substance of the animal.

In the *scelopendra electrica*, it appears to reside immediately under the integuments. In the *lyncus* discovered by Riville, it is contained in the ovary. Mr. Macartney believes that every part of the body of the *medusa* is furnished with this fluid, as there is no part that is not seen illuminated

under different circumstances, but Spallanzani affirms that it is only found in the large tentacula, the edges of the umbrella, and the purse or central mass; which he proved, he says, by detaching these parts successively, when they shone vividly, while the rest of the body neither gave light nor communicated any luminous appearance to water. Memoria sopra le meduse fosforiche. Mem. della Soc. Ital. tom. vii.

Spallanzani discovered a mucous luminous fluid in the plumule of the *penatulæ phosphorea*. Mem. della Soc. Ital. tom. ii.

The phenomenon of animal light has been attempted to be explained in different ways. By many persons it was formerly ascribed to a putrefactive process, but since the modern theories of combustion became known, it has been generally believed to depend upon an actual inflammation of the luminous substance, similar to the slow combustion of phosphorus. Others have accounted for the luminous effect, by supposing the matter of light to be accumulated, and rendered latent under particular circumstances, and afterwards evolved in a sensible form.

The opinion of the light of living animals being the consequence of putrefaction, is evidently absurd, and contradictory to all observation on the subject. It has been proved by the experiments of Dr. Hulme and others, that even the luminous appearances of dead animals are exhibited only during the first stages of the dissolution of the body, and that no light is emitted after putrefaction has really commenced.

Spallanzani, who was the most strenuous advocate for the phosphorescent nature of animal light, stated that glow-worms shone more brilliantly when put into oxygen gas; that their light gradually disappeared in hydrogen or in azotic gas, and was instantly extinguished in fixed air; that it was also lost by cold, and revived by the application of a warm temperature. He conjectured that the luminous matter of these insects was composed of hydrogen and carbonated hydrogen gas.

Forster relates, in the Lichtenberg Magazine for 1783, that on putting a *lampyris splendidula* into oxygen gas, it gave as much light as four of the same species in common air.

Carradori has made some experiments upon the *luciole*, (*lampyris italica*) which led him to deny its phosphorescence. He found that the luminous portion of the belly of the insect shone in vacuum, in oil, in water, and different liquids, and under different circumstances, where it was excluded from all communication with oxygen gas. He accounts for the result of Forster's experiment, by supposing, that the worm shone more vividly, because it was more animated in oxygen gas than in common air.

Carradori adopts on this subject, the doctrine of Brugnatelli, and ascribes the luminous appearances of animals to the condensation and extrication of light in particular organs, which had previously existed in combination with the substance of their bodies. He supposes the light to be originally derived from the food, or the atmospheric air taken into the body; in short, that certain animals have the peculiar property of gradually imbibing light from foreign bodies, and of afterwards secreting it in a sensible form. Annal di Chimica. tom. xiii. 1797.

The following experiments, which were lately made upon this subject by Mr. Macartney, would lead to different conclusions than those of the preceding authors.

Experiment 1.—A glow-worm was put into a glass of water, in which it lived nearly two hours, and continued to emit light as usual, until it died, when the luminous appearance entirely ceased.

*Experiment 2.*—The luminous substance was extracted from the before-mentioned *glow-worms*, and from others killed in different ways, but it afforded no light.

*Experiment 3.*—The faces containing the luminous matter were cut from the bellies of living *glow-worms*, and shone uninterruptedly for several hours in the atmosphere, and after their light became extinct, it was revived by being moistened with water; some of these were put into water in the first instance, in which they continued to shine unremittingly for forty-eight hours.

*Experiment 4.*—The luminous substance of a *glow-worm* was exposed to a degree of heat which would have been sufficient to inflame phosphorus, without increasing the brilliancy of its light: and farther, it could not be made to burn by being applied to a red-hot iron, or to the flame of a candle.

*Experiment 5.*—A delicate thermometer was introduced amongst some living *glow-worms*, during the time they gave out much light: the temperature of the room being 69°, the instrument rose to 75°, 76°, and 77°, according to circumstances, as the warmth was reflected from the hand, or dissipated by the worm crawling over cold substances. The luminous portion of the tail, when very brilliant, appeared to raise the thermometer more quickly than the other parts of the body; but it was not invariably the case. When shining strongly, the luminous rings appeared to communicate the sensation of warmth to the hand; but this was probably a deception, as the actual degree of heat was not sufficient for such an effect. It should however be mentioned, that in Templar's observations on the *glow-worm*, he said his feelings deceived him, if he did not experience some heat from the shining of the insect. Phil. Trans. N° 72.

*Experiment 6.*—To ascertain how far the evolution of heat, during the shining of *glow-worms*, depended upon the life of the animals, the luminous portion of the tail was cut off from several living worms: if the thermometer was applied to them immediately, it was raised by them one or two degrees; but after these parts were dead, although they continued to emit light, they produced no effect whatever upon the instrument.

*Experiment 7.*—Some *hemispherical medusæ* were put into a spoon, containing a small quantity of sea-water, and held over a burning candle. As soon as the water became heated, the medusæ appeared like illuminated wheels; the spots at the margin and centre alone emitting light; in which manner they shone vividly and permanently for about twenty seconds, when they shrunk and died, after which they were no longer luminous.

*Experiment 8.*—Some of the same species were put into spirits: a strong and unremittent light was instantly given out, which issued from the central and marginal parts, as in the preceding experiment, and continued until they died.

*Experiment 9.*—Some of the *scintillating and hemispherical species of medusæ*, contained in a small glass jar, were introduced into the receiver of an air-pump, and the air being exhausted, they shone as usual when shaken: if any difference could be perceived, the light was more easily excited, and continued longer in vacuum.

*Experiment 10.*—A *medusæ hemispherica* was placed in a small glass dish, containing a quantity of water, merely sufficient to allow the animal to preserve its figure: being insulated, it was electrified, and sparks drawn from it, which had not the slightest effect. The experiment was repeated several times with different individuals, but without exciting the animals to throw out light.

*Experiment 11.*—Some *hemispherical medusæ* were placed in contact with the two ends of an interrupted chain, and

slight electric shocks passed through them. During the very moment of their receiving the shock, no light was visible; but immediately afterwards the medusæ shone like illuminated wheels, which appearance remained for some seconds. Upon the closest inspection with a magnifying glass, no contractile motion could be perceived to accompany the exhibition of the light. The application of electricity, in this instance, seems to have acted merely as a strong mechanic shock.

It seems proved by the foregoing experiments, that so far from the luminous substance being of a phosphorescent nature, it sometimes shews the strongest and most constant light, when excluded from oxygen gas; that it, in no circumstances, undergoes any process like combustion, but is actually incapable of being inflamed; that the increase of heat, during the shining of *glow-worms*, is an accompaniment, and not an effect of the phenomenon, and depends upon the excited state of the insect; and, lastly, that heat and electricity increase the exhibition of light, merely by operating like other stimuli upon the vital properties of the animal. Phil. Trans. 1810, part ii.

In addition to these opinions, we may mention that professor Davy has found that the light of the *glow-worm* is not rendered more brilliant in oxygen, or in oxygenated muriatic gas, than in common air; and that it is not sensibly diminished in hydrogen gas.

We may further add, that Spallanzani's experiments of diffusing the luminous liquor of the *medusæ* in water, milk, and other fluids, are in direct contradiction of his own theory, as is also the extinction of the light of these mixtures by the application of a high degree of heat.

If the light emitted by animals were derived from their food, or the air they respire, as supposed by Carradori, the phenomenon should be increased or diminished, according to the quantity of food or air that the creatures consume. But we do not find this to be the case; for in those situations where they are sometimes found to be most luminous, they are deprived, in a great measure, of these assumed sources of their light.

In fact, the luminous exhibitions of living animals are not only independent of all foreign light, but are frequently destroyed by the latter. The shining of the *medusæ* was always found by Mr. Macartney to cease upon the rising of the moon, or at the approach of day; and when out of the sea, he never could excite them to throw out light until they had been kept for some time in the dark: all the luminous insects likewise secrete themselves as much as possible during the day-time, and go abroad only at night. It is true that the *scelopendra electrica* will not shine, unless it has been previously exposed to solar light; but it is to be observed that it shone as brilliantly and as frequently, after being kept a short time in a light situation, as when left uncovered the whole day. The circumstance of the *scelopendra* requiring exposure previous to its giving out light, is very unaccountable, as the insect, when left to itself, always seeks as much as possible concealment during the day: indeed it is the opinion of some naturalists, that it is killed by the light of the sun.

We shall terminate this article with the following conclusions, drawn by Mr. Macartney from his own observations, and from a careful review of all that had been written on the subject.

The property of emitting light is confined to animals of the simplest organization, the greater number of which are inhabitants of the sea. The luminous property is not constant, but in general exists only at certain periods, and in particular states of the animal's body. The power of shew-

ing light resides in a peculiar substance or fluid, which is sometimes situated in a particular organ, and at others diffused throughout the animal's body. The light is differently regulated, when the luminous matter exists in the living body, and when it is abstracted from it. In the first case, it is intermitting, or alternated with periods of darkness; is commonly produced or increased by a muscular effort; and is sometimes absolutely dependent upon the will of the animal. In the second case, the luminous appearance is usually permanent until it becomes extinct, after which it may be restored directly by friction, concussion, and the application of warmth; which last causes operate on the luminous matter (while in the living body) only indirectly, by exciting the animal. The luminous matter, in all situations, so far from possessing phosphoric properties, is incombustible, and loses the quality of emitting light, by being dried, or much heated. The exhibition of light, however long it may be continued, causes no diminution of the bulk of the luminous matter. It does not require the presence of pure air, and is not extinguished by other gases.

The luminous appearance of living animals is not exhausted by long continuance, or frequent repetitions, nor accumulated by exposure to natural light: it is, therefore, not dependent upon any foreign source, but inheres as a property, in a peculiarly organized animal substance or fluid, and is regulated by the same laws which govern all the other functions of living beings.

The light of the sea is always produced by living animals, and most frequently by the presence of the *medusa scintillans*. When great numbers of this species approach the surface, they sometimes coalesce together, and cause that snowy or milky appearance of the sea, which is so alarming to navigators. These animals, when congregated on the surface of the water, can produce a flash of light, somewhat like an electric coruscation. When the luminous *meduse* are very numerous, as frequently happens in confined bays, they form a considerable portion of the mass of the sea, at which times they render the water heavier, and more nauseous to the taste: it is therefore advisable to always strain sea-water before it is drunk.

The luminous property does not appear to have any connection with the economy of the animals that possess it, except in the flying insects, which by that means discover each other at night, for the purpose of sexual congress.

In the plates for illustrating the present subject in this dictionary, the reader will only find figures of those luminous animals which are not generally contained in books on natural history, or which are necessary for the explanation of lately discovered facts.

Fig. 1. is the *nercis nobilucis*, discovered by Vianelli, of the natural size.

Fig. 2. shews the same animal greatly magnified: *a* is the head, furnished with two short antennae and a horn-like process; *b, b*, the two eyes; *c, c, c*, some of the lateral twisted processes proceeding from the segments of the body; *d, d, d*, some of the other lateral processes that contain the tufts.

Fig. 3. is the *crustaceous insect*, discovered by Riville: *a* is the transparent shell, through which the internal parts of the animal are visible; *b*, the sac containing the intestines; *c*, one of the four-jointed setaceous antennae; *d*, the two feet armed with hooks; *e*, the foot which terminates in claws; *f*, the ova, which Riville mistook for globules containing a luminous oily fluid.

Fig. 4. exhibits the *cancer fulgens*, discovered by sir Joseph Banks. It is given of the natural size.

Fig. 5. represents the *limulus nobilucis*, discovered by captain Horiburg, greatly magnified.

Fig. 6. is the *medusa pellucens*, discovered by sir Joseph Banks, shewn less than the natural size.

Fig. 7. is the *pyrosoma atlanticum*, lately discovered and described by Peron.

Fig. 8. shews the *medusa lucida*, described by Mr. Macartney, of the largest size he met with.

Fig. 9. is the *beroe fulgens*, discovered by Mr. Macartney. It is represented of the usual size, and in the elongated form the creature assumes when in the act of swimming. On the posterior part are seen the ciliated ribs, which constitute its instruments of locomotion.

Fig. 10. shews the *medusa scintillans*, discovered by Mr. Macartney, as it appears to the naked eye.

Fig. 11. is the same highly magnified, by which the opaque parts upon the side and in the centre of the animal are made apparent.

Fig. 12. is the animalcule, discovered by Mr. Forster, of the size it appears to the naked eye.

Fig. 13. exhibits a microscopic view of the same animalcule.

Fig. 14. is an enlarged view of the inferior surface of the abdomen in the *lampyris lucida*, after the integuments had been removed, as delineated by Mr. Macartney: *a, a, a*, represent the three masses of luminous substance, which are applied to the three last rings of the abdomen; *b, b, b*, the arrangement of the cellular or interstitial substance on the other abdominal rings, which gives the pale colour to the whole belly of this insect.

Fig. 15. represents the common glow-worm, with the lower portion of the back cut away, to expose the sacs of luminous matter in situ on the last ring of the belly: *a* indicates the sac of one side; the intestine is seen to lie between them.

Fig. 16. is one of the light sacs of the glow-worm, taken out and prodigiously magnified, in order to shew its structure, as described by Mr. Macartney: *a*, the external part of the sac, which is composed of the interweaving of a spiral fibre; *b*, the luminous substance seen at one end, when the sac has been ruptured to expose its contents.

Fig. 17. is the *elater nobilucis*, with the shell of the corcelet removed on one side, by which the organ of light, described by Mr. Macartney, is uncovered; *a*, the yellow transparent spot of the corcelet; *b*, the oval mass of luminous substance surrounded by an irradiation of the interstitial substance; *c*, the ends of the muscles which are on the inside of the corcelet.

Fig. 18. shews the luminous apparatus of the *elater nobilucis*, considerably magnified: *a*, the radiated appearance of the interstitial substance around the oval mass of luminous substance: this mass is seen to consist of a number of smaller parts; *b* shews the arrangement of the interstitial substance, when it passes down between the muscles; *c*, the ends of the muscles of the back; *d*, the shell of the corcelet.

Fig. 19. is the *elater ignitus*: *a* indicates the yellow part of the corcelet; *b* shews the small mass of luminous substance in this species, the shell being removed.

LIGHT is also used to signify the disposition of objects with regard to the receiving of light.

Thus we say, a painting is seen in its proper light, when its situation, with regard to the light, is the same with that for which it was painted.

LIGHT, in Agriculture and Gardening. Experience has shewn its infinite service to the growth of vegetables, contributing exceedingly to facilitate their vegetation, and in-

## L I G H T.

crease their perfection and duration; as it is obvious most plants are considerably more prosperous, and attain their perfection in a free exposure, fully open to the light and air, than in shady places; the same is observed of fruits. Those growing in a situation full to the light of the sun, are in general more large and fair, ripening sooner, and more perfectly, as to beauty and richness of flavour, than such as grow in the shade: these reasons should therefore determine us to cultivate most of the principal plants and fruits in situations open as much as possible to the full light and influence of the sun; though upon particular occasions, and in the heat of summer, shady places may be necessary for some sorts of plants, though not where shaded and darkened by spreading trees, &c. but a border open above to the full light, and only shaded from the immediate rays of the sun. For the general crops, a perfectly open, sunny, light situation, free from the shade of spreading trees, is always the most proper.

And its utility is very evident, from plants growing in garden-frames, green-houses, &c. in winter; when, in time of severe weather, covers or shutters have been continued long over the glasses, so as to exclude the rays of light, they become sickly, grow pale, and assume an unhealthy appearance for a long time; the leaves often decaying or dropping off; and frequently, when the covers are continued very long without the admission of light, the whole plant in many sorts gradually dwindles and perishes. Great attention is of course requisite in this case, when, from the severity of the weather, the use of other covers besides the glasses is necessary, to take every opportunity of a favourable day, or even an hour or two of a day, to admit the light as fully as possible. The same is also the case with plants in early hot-beds, such as cucumbers, melons, &c. which, early in the year, require a covering of mats over the glasses every night; as when these additional covers are applied too soon in the afternoon, and continued late in the morning, so as to keep the plants long in darkness, it is highly disadvantageous to their growth, causing them to grow weak, pale, and sickly.

As light is, therefore, so beneficial to plants in general, it should be increased as much as possible to those in frames, green-houses, stoves, &c. In these situations it may be useful to paint the inside of all such departments white, to reflect the rays of light as much as possible, and particularly in the nights, and in the day time, when the severity of the season requires covers or shutters to be placed over the glasses or other conveniences where plants are kept.

The author of *Phytologia* remarks, that the contest for light, as well as for air, which is so visible in the growth of vegetables, shews the former to be of great consequence to their existence, as well as the latter. Thus many flowers follow the sun during the course of the day, by the nutation of the stalks, not by the rotation of them, as observed in the sun-flower by Dr. Hales; and the leaves of all plants endeavour to turn their upper surface to the light, which is their respiratory organ, or lungs. The great use of all plants turning the upper surfaces of their leaves to the light is thus, he thinks, intelligible; the water perspired from those surfaces is, he conceives, hyper-oxygenated; and, as it escapes from the sharp edges of the mouths of the perspiring vessels, when acted upon by the sun's light, gives out oxygen; which oxygen, thus liberated from the perspired water, and added to that of the common atmosphere, presents to the respiratory terminations of the pulmonary arteries on the upper surfaces of leaves an atmosphere more replete with vital air. This necessity of light to the respiration of vegetables

is so great, that there is reason to believe that many plants do not respire during the night, but exist in a torpid state, like the winter sleeping insects. Thus the mimosa, sensitive-plant, and many others, close the upper surfaces of their opposite leaves together during the night, and thus preclude them both from the air and light; and the internal surfaces of innumerable flowers, which are their respiratory organs, are closed during the night, and thus unexposed both to light and air. It is, however, observed, that the *fungi*, which are termed vegetables, because they are fixed to the earth, or to the stones, trees, or timber, where they are found, can exist without light or much air; as appears in the truffle, which never appears above ground, and by other fungi, which grow in dark cellars; and in esculent mushrooms, which are cultivated beneath beds of straw. The etiolation, or blanching of vegetables, depends upon the keeping of the light from them.

It is further noticed that the element of light, as well as that of heat, is necessary to vegetation. In this climate they both seem, in general, to be injurious only by their defect, and seldom by their excess. But as light acts as a stimulus on the more irritable or sensitive parts of plants, which appears by the expansion of many flowers, and of some leaves, when the sun shines on them; and by the nutation of the whole flower, as of the sun-flower (*helianthus*), and by the bending of the summits of all plants confined in houses towards the light; there may be diseases owing to the excess of this stimulus, which have not been attended to; to prevent which the flowers of *tragopogon falsus*, and of other plants, close about noon. Other unobserved diseases may be owing to a defect of the stimulus of light; as a *nimfa*, sensitive plant, which had been confined in a dark room, did not open its foliage, though late in the day, till many minutes after it was exposed to the light. The excess of light has not, however, been observed to be attended by vegetable diseases in these more northern latitudes so much as in others.

**LIGHT, in the Manner.** A horse is said to be light, in French *un cheval léger*, that is, a swift, nimble runner. We likewise call a horse light that is well made, though he is neither swift nor active; for in this last expression we consider only the shape and make of a horse, without regard to his qualities.

*Light upon the hand*; a horse is said to be such, that has a good tractable mouth, and does not reit too heavy upon the bit.

A coach-horse is said to be light, when he stirs nimbly, and dreads the whip; or when he has a light trot.

**LIGHT-bellied.** A horse is thus called that commonly has flat, narrow, contracted sides, which make the flank turn up like that of a grey-hound.

**LIGHT-hand.** See **HAND**.

**LIGHT, in Painting,** refers only to those effects which light (properly so called) produces upon the surfaces of natural objects; as exhibited by its reflection from them to the eye of an observer.

With regard to that art, light may be considered in two distinct points of view; *viz.* as to the natural and the artificial effects arising from it. The former is simply the effect produced upon the objects in a picture, by the direction in which it is introduced; which being once chosen, becomes a positive rule; and from which no variation can be allowed. The latter is ideal, and requires only to be probable or possible.

It relates to the quantity of light employed to illustrate the character of a subject, and depends entirely upon the taste of the artist; who, by the use of ideal shadows and fictitious lights, may effect a diminution or augmentation to

any proportion he pleases. These, together with light and dark colours, form the basis of chiaro-scuro; one of the grand fundamental principles of painting, of which we have already treated under the article CLARO-OBSCURE.

As light, when acting upon substantial forms, is always accompanied by shadow, and as they are necessary adjuncts to each other, we shall here unite them, and treat of them together. It is by the contrast of each to the other, that the effect of either is produced by colours; and however paradoxical it may appear, it is nevertheless true, that light in the art of painting is not more necessary to produce shadow, than shade is for the production of light. The colours which give the appearance of the former, obtain that effect only when surrounded with darker ones, which constitute shade; without the latter, they would appear nothing more than an uninteresting mass of one plain tone, without any degree of the quality which is termed luminous; but contrasted by their opposites in tone, they become brilliant; and when form is superadded, obtain the character of light. The same, though in the contrary degree, is the effect of dark hues, which, without the contrast of lighter ones, produce only a heavy, dull, unmeaning mass, that merits not the appellation of shade, till opposed by other tones, and rounded into form by the assistance of light.

The management of light and shade is the most important of the practical parts of the art; since, without the true arrangement of them, vain must be every effort of the painter to produce a just resemblance of those things which nature offers to our view, and which are the immediate objects of his study. Outline is but as the section of a body; and colour, a simple, unvaried colour added to it, would still in no-wise increase its value as the representative of a substance; but let light and shade be superadded, and duly disposed, and what was a flat surface becomes apparently a rounded one, is relieved from its ground, and appears to start from the canvas.

The sources of light are in fact but two; viz. the sun and fire; but to the painter a variety of modifications of these two take place, and become equally separate sources, with distinct qualities, both as to power and colour. Such, for instance, are the moon's reflecting power; that of the atmosphere when the sun is hid; and likewise the illumination proceeding from a window into a room. The effects produced by each of these differ so widely from those of the two former, that we may fairly say there are five general sources of light, at least, applicable to the purposes of painting. Of that proceeding direct from the sun in full blaze, it can only be observed, that, except for landscape, its use is confined in the art; being too powerful, and producing shadows too harsh, for the more intermingling and agreeable subjects of fancy or history. The softer illumination reflected from those parts of the atmosphere opposed to the sun, is usually and reasonably preferred; or that which the heavens yield when the source of its light is hid in clouds, though not when it is too much lost in the gloom of tempest; for then the lights and shadows become too indistinct and confused. The open light of the air has another character distinct from the two just mentioned; which is, when the sun is but faintly obscured by thick clouds, through which its rays penetrate with diminished lustre, but still in direct lines. In this case the light, though direct and causing shadows the same in form as when its source is unobserved, is yet but weak and soft; and the shadows it produces being effected by the general light of the atmosphere, are tender in their outline and tone. When the reflected light proceeding from the northern parts of the atmosphere is ad-

mitted through a window into a room, it assumes a mid-way character. For while the light is weaker, and consequently softer than sun-shine; the shadows, owing to the smallness of the aperture, become distinct but not harsh; and their distinctness is heightened by the room wherein is the window, (which may be considered as an original source,) receiving only a partial quantity of light, and consequently little or no reflection takes place, except from surrounding and contiguous objects upon each other: whereas, when a figure is so placed in open air as to receive the light reflected from the sky, it partakes of it in every direction, and therefore has little or no shadow; for there will be few parts where some rays of light will not, under such circumstances, find admission.

When the light proceeds direct from the sun, it is usual, though not strictly correct, to consider its rays as parallel, and consequently no enlargement or diminution takes place in lengthened shadows. But, in reality, its distance, which diminishes its size apparently, added to the effect of perspective, produces a real variation in shadows of objects whose magnitude is at all considerable. This is always the case when the source of light is larger or smaller than the illuminated body. In the former case, the shadow of a suspended ball would diminish to a point; as that of the earth does from the light of the sun; and in the latter it would dilate as it was extended, and project a shadow at a certain distance, large in proportion to the comparative smallness of the luminous body; as of the flame of a candle, for instance, compared to a tennis-ball.

Shadows by day-light seldom become totally obscure: an object must be placed in a situation where it could receive very little indeed of that peculiar illumination, without having some reflections falling into its shades, and consequently yielding some visible effect of the forms on which they fell. But by fire and candle-light, owing to the confined issue of their rays, forms hid in the shadows they project are often totally lost; nevertheless, these shadows are not blacknets, but darknets, of a colour whose hue depends upon that of the larger mass of surrounding bodies. Under many circumstances they receive reflections, and have a consequent degree of colour in the bodies that lie within their range.

There are two causes which operate to weaken and even destroy the force of reflected light. The one is the distance at which the reflecting object is situated from the luminary; the other, the distance of the same from the observer. When these two circumstances combine, the effect of light and shade is very weak.

To comprehend the principle upon which the illumination and consequent shadows of objects are produced, and to imitate them the most effectually, the painter must recollect, that light, whencesoever it issues, proceeds rectilinearly from its source to the surface which intercepts it; and is reflected in the same way, at an equal angle with the plane of that surface, but in an inverse direction. In the language of optics, *the angle of reflection is equal to the angle of incidence*. This is the simple but general rule, which is inally to guide the artist through all the difficulties of light and shade in painting; whether arising from direct or reflected illumination; this one principle holds equally good in all; but the lines which it forms in the shadows, are subject to the variations produced by perspective on all solid bodies whereon light can act.

The most important application of this rule the artist will find to be, in fixing upon the precise point where he should dispose of his most brilliant hues; or what are technically termed his high lights; which are, in reality, those parts of

his objects, where, if the surface be a polished one, the image of the luminary is reflected; and is of course that one which, to the eye of an observer, is most illuminated. These reflections will always be found to take place only on that point from whence a line drawn to the luminary, and another to the eye of the artist, form angles equal to each other with the plane of the surface of the illuminated object. For though it may not in reality be the precise spot where the greatest number of rays of light are intercepted by that body, yet it is effectually so to him whose eye can only receive those which are thrown off in reflection towards him. It may be observed as a consequence of this rule, that the extreme edge of a rounded body can scarcely ever be its brightest part; it will, as it recedes from the observer, lose to him its lustre, and melt into the ground or object behind it; or, if relieved by a flat object equally white with itself, a dark line will be seen to mark its boundary, in whatever situation the source of light may be, within a right angle with a line drawn from the object to an observer; or somewhat beyond that, to nearly 135 degrees.

It is scarcely necessary here to speak of the refraction of light from its original course, when passing through various substances, as glass or water; except to deprecate paying any attention to it in a picture where any essential form is broken in upon by it; or choosing such subjects, where deviation from general rules serve rather to confound than to satisfy the common understanding of mankind. These copying the positive truth would create confusion, it is most just, at least most useful, to vary from it: as in painting the portrait of a man with spectacles on. What artist in his senses, and who had a true perception of the real object of art, would think of painting exactly that which presents itself to his view, a positive deformity, eyes misplaced, and of monstrous form; for such they are when seen through the glasses. Such procedure would totally defeat the object of portraiture; and it would be hardly possible to make a likeness of the person, with such a variation from the positive form of his face.

The direction in which the light falls upon the objects introduced into a picture, and which we proposed at the beginning of this article as one of the points of view in which to consider the subject, is of very great importance on many accounts, and calls for the most attentive consideration of the artist before he begins to colour his picture, and even in the composition of his forms. If, without previous attention to this, he proceeds to execute his composition, and complete the development of his ideas, he would be fortunate if he did not find in his progress, that the necessity he was under of making shadows to bring out his forms, very frequently destroyed his general shapes, which previously appeared well when in lines only. A due attention to this, in the first instance, would frequently suggest ideas of forms, and assist him in filling his canvas agreeably, and in expressing the character of his subjects appropriately. It is, however, utterly impossible to give precise rules upon this subject in historical paintings, as it depends so entirely upon the nature of the subjects, and the local situations of the actors introduced. One general rule only may be given, *viz.* that the disposition of the figures should be such, with regard to the source of light, as to produce ample masses of light and shadow: either of the one or the other predominant, accordingly as the subject is grave or gay. If the subject be of one single figure, then it is requisite (and more easily to be managed) that care be taken that the light falls upon it in such a manner as accords with the action, and produces no unpleasant shapes. For great grace may be added to

figures by light and shade when agreeably disposed; and on the contrary, an unfortunate disposal of them may diminish the effect, if not totally destroy the most beautifully drawn figure imaginable.

In portraiture, something more precise may be said upon this subject. Its object is to convey a resemblance of a person in the most agreeable manner, generally speaking; yet therein much must remain which the rules cannot attach to, particularly where the object is to convey character strongly, and not merely to render the picture agreeable. In the latter case, if a person be so placed with regard to the window or luminary, that the light falls upon him at an angle of about 45 deg., and the greater part of the face be exposed to it, the purpose will be answered. A still more acute angle will give greater relief, but the effect will not be so pleasing. Whether the face should be turned directly facing the light, or so as to receive it partially, must entirely depend upon the character of the features. If large, they will bear a full light; if of a smaller and more delicate nature, a little inclination from the light will give more force and variety. But where the object is to convey character strongly, to the disregard of positive beauty, there the character only is the guide, and every angle of illumination, with any turn towards or from it, may effect the object, according to the stamp which nature has laid upon the face to be painted.

The angle of 45 deg. or thereabouts, is also the best for the general illumination of a picture while the artist is employed upon it, with such an inclination from the source of light, that no reflection of it is presented to his eye. He will, in this situation of his work to the light, be left in his own way, and see the whole of it together most effectually; but this is an object of lesser moment; a good artist need not wait to have his picture precisely in the very best situation, to enable him to perform his task with pleasure or effect. Indeed he cannot always have it so, particularly when engaged in adorning walls and ceilings, &c.

With regard to the second division of our subject, or the quantity of light proper to be introduced into a picture, which is a matter that lies entirely at the discretion of the artist, we must principally refer our readers to what has been said under the articles *CLAIR-OBSCURE*, and *EFFECT*, in *Painting*; more particularly the latter, where we have shewn that various masters have adopted as various quantities, and shaded them all agreeable. The subject, the place, and the time, must govern this point, and the taste of the artist must lead him to decide the matter for himself; his only guide is, the most natural, and at the same time the most effective, illustration of his subject.

Another point for consideration, is the tone of colour which should be given to the light. Of this, also, we have treated under the words *EFFECT*, in *Painting*, and *HARMONY* in the same art, and need only state here, that whatever hue is adopted, the same should range through the whole picture, except when two kinds of light are introduced, as day-light and candle-light. In that case the former will be of a cold colour; and in situations where shadows from the candle fall over parts illumined by the day, those parts, if the object be white, will appear of a light blue, as may be seen when candles are lighted and placed on a table-cloth, where rays of twilight can reach. The warm colour thrown off by the flame of the candle, imparts its nature to whatever it illumines, and as it is nearly yellow, it renders white and yellow very nearly alike in hue, and makes green appear blue, and purple nearly so. This renders it a difficult matter to paint by candle-light for a day-light exhibition. The artist must

## L I G H T.

rely very much upon his judgment and previous knowledge of his colours who attempts it, or all the delicate admixture of tints and hues will escape him. Rubens has very frequently succeeded in the admixture of lights, and in one picture particularly, his beautiful work of "St. Roch interceding for the unhappy Sufferers from the Plague." And Titian has rendered most beautifully the effect of three lights, *viz.* those of the day, of fire, and of candle, in his grand work of "The Martyrdom of St. Lawrence;" and has contrived to produce one harmonious tone over the whole, while each part is characteristically maintained.

LIGHT, in *Sea Language*, is used in contradistinction to laden. A ship is accordingly called light, either when she has no cargo, or when she is not sufficiently ballasted.

LIGHT is also used for the luminous body that emits it. There are various kinds of lights; *general* lights, as the air; *particular* lights, as a fire, a candle, and even the sun.

LIGHTS, in *Architecture*, denote doors, windows, and other places, through which the air and light have a passage.

In the Pantheon, all the light comes from on high; it has no lights but in the dome.

LIGHTS, in *Gardening*, a term applied to the moveable glazed sashes which cover garden and other frames; and which, according to the number of lights, or separate moveable glasses, are denominated one-light, two light, and three-light frames; these being the most general different sizes of this sort of frame. See FRAME and GARDEN-FRAME.

LIGHTS, *Fest of*. See DEDICATION.

LIGHTS, *Stopping, of a house*, is a nuisance; but stopping a prospect is not, being only matter of delight, not of necessity. If a man has a vacant piece of ground, and builds thereupon a house, with good lights, which he sells or lets to another; and afterwards builds upon ground contiguous, or lets the same to another person, who builds thereupon to the nuisance of the lights of the first house; the lessee of the first house may have an action of the case against such builder, &c. And though formerly they were to be lights of an ancient messuage, that is now altered.

LIGHT-HORSE, an ancient term in our English customs, signifying an ordinary cavalier, or horseman lightly armed, and so as to enter a corps or regiment; in opposition to the men at arms, who were heavily accoutred, and armed at all points. See CAVALRY and HORSE.

END OF VOL. XX.











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